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VOL. XXXI ST. LOUIS, AUGUST, 1921 No. 8

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

ACCESSORY SINUS BLINDNESS; DIFFERENTIAL DIAGNOSIS AND OPERATIVE TECHNIC.*

DR. LEON E. WHITE, Boston, Mass.

As there has recently been much just criticism of the unwarranted opening of accessory sinuses in loss of vision due to intracranial lesions, and as fatalties also have been reported, there is danger that the pendulum will swing too far the other way and that an operative procedure of the utmost benefit in suitable cases will be discredited.

Realizing that in previous articles many points have not been clearly expressed and not a few exceptions taken (some of them very good ones), I wish to re-present the subject and discuss the objections and criticisms that have come to my attention.

While it is right that one should stand by whatever is of true worth, it is not right, simply because an opinion has once been expressed, to hold it in obstinate blindness after it has been proven erroneous. The cultivation of the habits of continual self-correction and self-abnegation will promote the interests of those poor unfortunates we are endeavoring to benefit, vastly more than retaliation.

In a study of a subject like this, one is always getting new facts and ideas and discarding those which are untenable. Honest criticism, therefore, is of enormous benefit, otherwise there would be

*Read before the New England Otological & Laryngological Society at Boston on January 26, 1921.

little or no progress. Cordial co-operation rather than antagonism between the cerebral surgeon, the neurologist, the ophthalmologist and the rhinologist is most essential. Believing with Sir Thomas Browne that "in all disputes, so much there is of passion, so much there is of nothing to the purpose; for then Reason, like a bad Hound, spends upon a false scent, and forsakes the question first started."

The subject will be considered under the following heads: 1, Differential diagnosis; 2, Recovery with or without operation; 3, Operation with so-called "negative nasal findings;" 4, Operative technic; 5, Fatalities.

A history of early loss of vision directly in front of the eye and ability for some time to see sideways, suggests a central scotoma which is a point of great value in diagnosis of accessory sinus blindness. According to de Schweinitz "the affection appears to depend upon an interstitial neuritis, most severe in the optical canal, and at first chiefly located in the papillo-macular tract from which it may extend, however, until the whole diameter of the nerve is involved." Visual fields (where there is sufficient sight to make one) are of the utmost value, but in many cases there is not even light perception. In many of the brain tumor lesions the central field may be good or there may be a bi-nasal or bi-temporal hemianopsia or a homonymous hemianopsia.

The various other causes of retrobulbar and optic neuritis should be given consideration and I will mention the principal ones:

Local Causes: Cellulitis of orbit, infections of orbit, wounds of orbit, tumors of orbit, thrombosis of orbital veins, hemorrhage into nerve sheath, wounds or tumors of optic nerve or globe, infection from accessory sinuses.

Intracranial Causes: Pituitary lesions, tumors, hemorrhage, hydrocephalus, abscesses, cavernous sinus thrombosis.

General Causes: Acute febrile diseases, nephritis, influenza, anemia, diabetes, syphilis, toxemia from lead, tobacco, alcohol, etc., toxemia from pus foci (accessory sinuses), methyl alcohol, Leber's disease.

It is of the utmost importance to rule out acoustic and other brain tumors, as well as multiple sclerosis and allied conditions. A careful but not especially difficult neurological examination should, therefore, be made. The following list of questions and tests is, with some slight modification, the one used at the Brigham Hospital and I am indebted to Dr. H. H. Vail for drawing it up.

NEUROLOGICAL EXAMINATION.

Name, address, occupation: Husband or family: H, F, M, S, B.

Past History, including operations on: head, nose,, ears, eyes, mouth, injuries, cardio-respiratory, gastro-intestinal, genito-urinary, neuro-muscular, catamenia; Habits: tea, coffee, alcohol, tobacco, drugs. Weight.

Present Illness: Complaints, headaches, visual disturbances, dizziness, nausea and vomiting, unsteadiness, convulsions.

Sensory and Motor Disturbances: Diplopia, epilepsy, Jacksonian seizures, tinnitus, deafness, facial paralysis, sensory disturbances.

Disturbances of Higher Psychical Functions: Amnesia, aphasia, binasal hemianopsia, bi-temporal hemianopsia, visual and auditory hallucinations, loss of sexual power, obesity, polydipsia, polyuria, increased appetite, especially for sweets, lowering of bodily temperature, amenorrhea, sterility, overgrowth of skeletal frame, loss of vigor, dryness of skin and hirsutes, character of headache and general progress of symptoms.

Uncinate Attacks: Olfactory hallucinations, "brown study."

GENERAL APPEARANCE AND CONDITION.

Cranial Nerves: Olfactory: subjectively: any disturbance. objectively: vanilla, right, left; ammonia, right, left; camphor, right, left. *Optic:* Vision, right, left; fundi, right, left; visual fields. *Motor Oculi:* Pupils, right, left; muscle movement, strabismus, ptosis. *Patheticus:* Superior oblique. *Trigeminal:* Subjective, numbness, tingling, anesthesia of face, anesthesia of tongue. Objective, corneal reflexes; sensation, tested pin prick; sensation, tested dull object; sensation, tested hot and cold tubes; sensation, tested light stroking cotton stick. Motor: contraction, masseters; contraction, pterygoids.

Abducens: External rectus.

Facial: Movements of face (central v. peripheral); taste, (anterior 2-3 tongue) salt, right, left; sugar, right, left; quinin, right, left.

Acoustic: Cochlear: tinnitus, right, W, V, Ac, Bc, D, G, left: vestibular, pass-pointing before syringing: left arm, right arm. Barany test.

Glosso Pharyngeal (sensory nerve to naso-pharynx, pharynx, soft palate, posterior 1-3 tongue, motor fibres to swallowing muscles). Subjective: anesthesia of throat, regurgitation of food. Objective: sensation of soft palate (cotton stick both sides throat), movements soft palate.

Vagus: Hiccoughs, pulse and heart rate, vocal cords, hoarseness, trouble swallowing.

Spinal Accessory: Elevation of trapezius; elevation of sternomastoid.

Hyper-Glosso: Protrusion of tongue, atrophy of tongue.

Cerebrum: Right or left handed? Frontal lobes: Memory, intelligence, sense of smell, speech (motor): spontaneous writing, writing from dictation. Pre-Central (Motor Functions): Arms, legs, trunk. Post-Central (Sensory Functions): Arms, legs, trunk. Temporal Lobes: Homonymous hemianopsia, visual speech, auditory speech, sensory speech. Occipital Parietal: Visual hallucinations, hemianopsia (general complete is due to tumor). Parietal Lobe: Stereognostic sense.

Cerebellum: Gait, balance or Romberg, nystagmus, co-ordination: hands on table, move pronate and supinte; finger to nose; finger to finger; thumb to fingers; rapid finger movements. Adiadokokinesia. Past pointing: left, right.

Vasomotor: Any disturbance of flushing, perspiration, syanosis, erythemia, dermographia, upper right, lower right, upper left, lower left.

Sphincters: Involuntary urinations, involuntary bowel movements.

Physical Examination: Skin, head, eyes, nose, ears, mouth, neck, glands, thorax, lungs, heart, pulses. Blood pressure: Sys, dias. Abdomen. Extremities: Length, cushioned, tremor, clubbing, edema, scars or ulcers. Reflexes: Knee jerk, ankle jerk, Babinsky, abdominal, cremasteric, Kernig. Rectal: pelvic.

Summary: Subjective; objective, X-ray of sinuses, sella turcica, skull, finger joints (for pituitary); Wassermann; urinary analysis.

Recovery With or Without Operation: As to this second division, by all means let the non-surgical method be given a fair trial. In the typical case of retrobulbar neuritis where the eye is slightly sensitive to pressure with occasionally some exophthalmus, even with complete loss of vision, recovery without operation frequently takes place. There is this to be said however: There must be some condition in the accessory sinuses that renders the optic nerve susceptible to either pressure or infection. If there is evidence of suppuration, its source should be sought and eliminated. It is also good judgment to correct any predisposing conditions, such as marked enlargement of the middle turbinate or a deflected septum.

To illustrate when and when not to operate: In the case of large middle and superior turbinates which normally almost block the posterior sinuses, it takes but slight swelling plus some infection to produce an inflammatory process which extends by continuity of tissue to the optic nerve. Permanent impairment of vision may re-

sult before the turbinates of this type sufficiently subside to permit ventilation, hence the necessity for operative interference. While on the other hand, an acute swelling in the middle and superior turbinates normally not hypertrophied and not in such intimate relation with the posterior sinuses, may subside quickly without impairment of the nerve. This latter type can usually be treated successfully, as I have proved in several instances, and two such cases will be found at the end of this paper. Hypertrophied middle turbinates were removed in two cases (Nos. 3 and 6) that gave a history of previous attacks, even when the eye was well on the road to recovery. This was done to prevent further recurrences and has proved successful up to the present (5 years in one case, 3 years 4 months in the other). Had this method been followed in case 16, the final outcome might have been equally good. This patient gave a history of having noticed on awaking a constantly present blue spot in front of the right eye and everything blurry. Under constitutional treatment this cleared up in about three weeks and for a year the vision was normal. Then there was a recurrence and valuable time lost while awaiting the return of the vision as before, but in spite of treatment it went from bad to worse. When I first saw him some two years later it was only 20/200 and the nerve was white. There was a marked deviation of the septum to the right and the middle turbinate was tightly wedged between it and the ethmoidal wall. This man had been most carefully investigated,—he underwent thorough physical, neurological, dental, rhinological, ophthalmological, roentgen-ray and Wassermann examinations, but no explanation was forthcoming as to the etiology. The importance of the blocking by the hypertrophied middle turbinate and deflected septum was not appreciated, and nothing was done during the period when he might have been benefited.

Each case should be considered on its own merits and the possibility of recurrence borne in mind. The size and position of the middle and superior turbinates are, I believe, the keystone to this question of recovery with or without operation.

By the term superior turbinates is meant the one and occasionally two structures located above the middle turbinate and variously designated as upper, superior, supreme, third or fourth turbinates. Where there is a fourth turbinate the sphenoidal ostium is high, as it always opens into the superior sphenoethmoidal fissure.

That blindness may result and that speedily unless the accessory sinuses receive prompt attention, cannot be too greatly emphasized. From statistics I am endeavoring to determine somewhat on a chrono-

logical basis, somewhat on the degree of loss of vision and principally from the size and position of the turbinates, how long one can safely delay.

In one of my retrobulbar cases (No. 24) there was complete unilateral loss of vision for eleven days before the patient could be persuaded to enter the infirmary. The nerve was turning white when the sinuses were opened. Following her discharge three days after the operation, she contracted influenza and when she returned five weeks later there was well developed optic atrophy. She could, however, make out fingers at six inches. This case well illustrates how quickly permanent impairment of the optic nerve can take place. If she had not contracted the influenza and it had been possible to treat the sphenoid by hot irrigation and argyrol, more of the vision might have been saved.

Another case (No. 22), a colored girl, came to the Eye Department of the Eye and Ear Infirmary a week after onset of what was diagnosed as a unilateral retrobulbar neuritis with complete loss of vision. She was referred to the Massachusetts General Hospital for examination. As lues was suspected a Wassermann and lumbar puncture were taken, and she was not sent to the Aural Department until five weeks after the onset of the trouble. The nerve at this time showed marked pallor, but as the middle turbinate was hypertrophied and the other findings negative, the accessory sinuses were drained. Two days after the operation the patient was able to distinguish hand movements. She contracted a severe cold and lost this slight gain. The pallor of the nerve increased, and when she was discharged at the end of ten days there was not even light perception. The fundus some three months later showed marked optic atrophy. This case might have been benefited by an earlier operation. It, at least, confutes the saying that *all* these cases recover spontaneously.

Another case of unilateral retrobulbar neuritis (No. 18) of four weeks' duration, illustrates how quickly improvement may commence in an eye becoming progressively worse. Vision 20/100. slight pallor on temporal side of disc, eyesight had failed rapidly during the previous week. The patient had a severe cold with pain through forehead a week before the onset of haziness. The septum was deflected to the opposite side, but the middle turbinate on the affected side was enlarged and especially obstructive. The usual operation. Thickened tissue found. Recovery rapid. Two weeks after operation vision was 20/30 and eventually became normal,

although a slight pallor of the disc remained. Could one, with safety to the eye, have waited longer for return of the vision?

Still another case of four weeks' standing (No. 14), a child of 5 years, had bilateral neuro-retinitis with total loss of vision for three weeks. Fundi showed stellate exudates and dilated veins. Slight deviation of septum high up and both middle turbinates swollen. Case treated a week without relief, then middle turbinates removed and ethmoids opened. Light perception two days after operation. In six weeks the child could count fingers at twenty feet, but considerable pallor of disc remained.

It illustrates the seriousness of optic neuritis and the necessity of early operation. How much longer would one have been justified in waiting in a case like this? The child was under observation a week and operated on only as a last resort, as it was considered a difficult and dangerous procedure. An earlier operation might have saved more of the vision, but how much better to have impaired vision than none at all! Dr. H. B. C. Riemer, who has followed the child, thinks he sees well enough to attend the public schools.

The objectors say the operation is so frequently done just before the patient would commence to improve anyway, that it proves nothing. This is a difficult argument to answer, as the case generally is operated upon, or at least should be, before there is atrophy. There is this to be said: As there was great variation as to the time of operation after the loss of vision one must have had an unusual insight into the future to hit upon that identical period when nature was just ready to do the work that we, in our impatience, took away from her. Thus, six operations were performed within the first week and all recovered with normal vision; probably some would have recovered without, but why did not the five done within two weeks show equally good results? Two of these five did recover with normal vision, two with slight impairment, *i.e.*, 20/20, and pallor of the nerve; the fifth case only recovered enough to count fingers at six inches and had marked optic atrophy. Of the four cases operated on between the second and fourth week, normal vision but with some pallor of the nerve was obtained in but one; and while the three others improved, in none did the vision ever approximate the normal.

Take the four cases operated on between one and two months, one recovered with normal vision, a second with slight impairment, and the best a third could do was to count fingers at three feet, and the fourth did not even have light perception.

Of the five cases operated on of over two months' duration, there was no improvement in two and it was so slight in the other three as to be almost negligible. If statistics are of any value, they show that early operations do accomplish vastly more than late ones and that the optic nerve can be permanently damaged within eleven days. Each case must be individually considered, there being no time rule applicable to all. The fundus should be carefully watched. Commencing pallor or undue engorgement indicate the advisability of unloading the congestion.

In what field of surgery does one operate only on the cases that would otherwise have succumbed? Surely many an appendix has been removed unnecessarily. How many mastoids are opened that would have terminated fatally? We continue to open mastoids and the appendix operation is not ancient history. Just because these operations are sometimes needlessly performed, would not one be shortsighted to condemn all these life saving procedures? It requires judgment to determine what cases to watch and what ones to operate upon. There comes a time when the skilled surgeon considers the interests of his patient are safeguarded better by attacking the infection surgically than by waiting. This argument applies just as truly to one who has lost vision. Unnecessary surgery cannot be too strongly condemned. The surgeon should be reasonably assured of the diagnosis, and then if the safety of the eye is best conserved by draining the sinuses, he should, by all means, go ahead, presupposing, of course, that the operator is competent and that he does not perform too radical an operation.

It seems a pleasing diversion for many to tell of such and such a case of theirs with almost or quite complete loss of vision that recovered without operation. I wonder how many mention the case that did *not?* I have been told of many of these unfortunates and have seen not a few. One of them (Case 27) is given in detail at the end of this paper.

Operations With So-Called "Negative Nasal Findings."—In a previous article I unfortunately was rather vague in expressing how little was evident on inspecting some of these noses, the phrase being "that many of these cases have a condition so elusive as to be difficult of detection either microscopically or macroscopically, and case after case has demonstrated that pressure sufficient to cause atrophy of the nerve can take place in a nose that on both inspection and roentgen-ray examination shows practically nothing abnormal." This has been interpreted by some as meaning that I advocated operating on normal noses, and by others that there was no pathology in

these sinuses. The expression "*practically nothing abnormal*" had been the report in so many cases, before the importance of blocking by the middle and superior turbinates was recognized, that use was made of it in an endeavor to impress on the rhinologists how little should be expected from merely looking into the nose. The diagnosis was to be made largely by excluding other possible causes, *i.e.*, after negative "medical, neurological, dental and Wassermann examinations." Then, when the condition of the eye was unimproved or becoming progressively worse, it was advised that the middle turbinate should be removed and the posterior sinuses opened, even if they appeared negative. This advice was given because it was often impossible to tell on inspecting the nose what was taking place in the sinuses. *As* this talk about negative nasal findings was on the second page and the advice *not to operate* until after a *thorough investigation* was on page *3*, it would seem that no one got beyond page *2*. Let me emphasize now what *should* have been more clearly expressed before, *that normal noses do not produce loss of vision;* but in many that *seem* normal, there is infection, even if not evident.

Not having known what to look for until I had seen ten or twelve cases, I was trying to impress on the rhinologists that they must get away from expecting to detect marked infection in the sinuses by simply inspecting the nose. An obstructive middle turbinate that might easily have escaped attention has been all that was seen in several cases where marked changes were found in the sinuses on operating.

To corroborate this view of operating with so-called negative nasal findings, after the exclusion of other possible causes, the following extracts are taken from the writings of men whose opinions are respected by the rhinologists and ophthalmologists throughout the country:

Beck says: "I often wonder if in some of these cases it would not be wiser to operate immediately and then make a Wassermann or other diagnostic measures, because while waiting to make a diagnosis by exclusion, the nerve may be irreparably damaged by the swelling. It will be admitted that a latent lues may exist in a nonluetic sinus disease and many a so-called toxic amblyopia has been treated by withholding tobacco and alcohol, and have gone blind, while the sinus disease was not taken into consideration, because there was no pus in the nose or the *X*-ray was negative."

Onodi, who has written and studied this subject more than any one else, says: "I must emphasize this fact, that in those cases of sight derangements in which the oculist cannot confirm the cause,

and the suspicion of nasal connection exists even though the findings be negative, it seems best to take explorative measures, and to seek the cause in the accessory sinuses, whether or not the presence of latent foci is suspected."

Posey: "The connection between the sinusitis and an ocular inflammation can often be made only after very skillful and repeated examinations. Until within a very short time many ophthalmologists dismissed the possibility that an ocular inflammation could have originated in a sinusitis, by the patient's declaration that he did not have at the time, or shortly after, a bad cold in his head, or by the statement of an assistant, who took but a hasty view of the nares, that there was no pus in the nose. * * * That *congestion of the sinus without exudation,* is sufficient to occasion ocular symptoms—I have seen demonstrated in cases where competent rhinologists had failed to discover any exudate in the sinus whatever. * * * There were cases of retrobulbar inflammation of the optic nerve which were observed in earlier years following grippe and in association with catching cold or rheumatism, where in place of the simple and effective treatment directed to the sinuses, they received active and often depressing and harmful general medication; as a consequence, blindness was the not infrequent result."

De Schweinitz says: "That the sinuses have been frequently neglected, or that rhinoscopic examination had failed to detect sinus infection where later investigations or later results have demonstrated well marked disease.." Also "no patient with retrobulbar neuritis should escape searching examination of the naso-pharynx, the ethmoid, frontal and sphenoidal sinuses. * * * Operation with suitable drainage may speedily relieve the ocular condition. If this is neglected blindness may result. * * * The most important group of ocular complications of nasal sinus disease are those in which there is sinusitis without external signs of orbital inflammation; there is an optic neuritis or a neuro-retinitis without marked ophthalmic changes, simply a central scotoma. The scotoma may be unilateral, the more usual condition, or bilateral, and most frequently depends upon disease of the posterior ethmoidal cells or the sphenoid sinus. Investigations of Onodi have shown that the optic nerve often is in close relation with the posterior ethmoidal cells and that the thinness of the intervening wall renders involvement easy, often easier, it is probable, then in the case of the sphenoid which anatomically may come in close relationship with the nerve and form the inner wall or the lower and inner wall of the optic canal. According to Birch-Hirshfeld, the nerve lesion consists in

edema, swelling and proliferation of the glia cells and destruction of the nerve fibres. These he attributes to venous stasis and also to toxic agencies. * * * The author has seen elaborate optic neuritis followed with optic nerve atrophy with extensive disease of the ethmoid, frontal and sphenoid sinuses. * * * The visual fields in disease of the sphenoid sinus may exhibit alterations analogous to those in affections of the pituitary body. * * * If the cause of these optic nerve complications is not recognized and speedily removed, either by suitable intranasal drainage with or without operation, blindness from optic nerve atrophy is likely to result."

Van der Hoeve says: "Enlargement of the blind spot for white and colors points with great probability to diseases of the posterior nasal accessory sinuses and justifies operative interference for this disease if there are no other discoverable causes for its presence. Early treatment can cure the optic nerve affection."

Harmon Smith: "It is unquestionably a justifiable procedure to operate on these sinuses when every other possible cause of the neuritis has been eliminated. Even where there is no local or intranasal evidence of the existence of an empyema, such interference may be justified as an exploratory operation, and when performed by one familiar with the anatomy, it is without material danger to the patient. The mere depletion incident to such an operation will in itself prove of value if the neuritis is due to the pressure of a diffuse inflammation."

Dr. James Bordley, Jr: "It has been my fortune to see a fair number of optic nerve lesions, produced by quite evident sinus disease, and it has also fallen to my lot to meet more than a few which could be determined only by close and repeated observations. There is, I believe, a too frequent study of intranasal disease by physicians who judge the probability of ocular complication by the extent of disease found; there are others who apparently conclude that, without visible evidence in the nose, it is fair to assume that no sinus disease exists. Often neither of these assumptions is correct, and they may lead to very serious consequences. When a general surgeon stands between doubt and certainty as to intra-abdominal disease, he generally plays safe by 'looking' into the peritoneal cavity. Assuming that the operator is qualified, and assuming also that all other probable causes have been eliminated and that every means of diagnosis has been resorted to, I will suggest that when you are face to face with a serious optic nerve disturbance, the part of conservatism and good judgment requires an operative exploration of the ethmoidal and sphenoidal cells. I feel quite confident that visual

disturbances are frequently the first suggestions of serious sinus disease which may eventually lead to blindness or to death. It is only fair, then, to heed the warning and eradicate the disease before it has impaired function or destroyed life."

Arnold Knapp says: "Optic neuritis of nasal origin occurs in two forms: one during the course of suppurative sinusitis; the other where there is a typical retrobulbar neuritis and the rhinoscopic examination is negative. In the latter cases, exploratory operation reveals a latent infection. The more acute the case the more rapid the loss of vision and the better the prognosis. The effect of the nasal opration is remarkable. The nasal diagnosis in these acute cases is often difficult; even with negative rhinoscopic findings an exploratory operation must frequently be undertaken."

Vail: "The disease should be recognized and operation on the ethmoid performed at once in spite of its being normal in appearance. The diagnosis is made solely from ocular findings. The prognosis is good as to restoration of vision if the operation is performed during the acute stage, but if it is delayed until atrophy sets in, the prognosis is bad."

Loeb says: "The first two cases which present features of unusual interest are reported to call attention to the rapidity with which serious eye symptoms may disappear after appropriate nasal treatment. Furthermore, the ready recovery for the serious eye lesions under the circumstances is as convincing of their nasal origin as anything could be, short of autopsy findings."

Loeb and Wiener: "Conditions such as swelling of the papilla and optic neuritis associated with blindness almost miraculously and instantly relieved by intranasal operation are probably of vascular origin comparable to edema glottidis occurring in connection with a severe infection of nearby tissues. * * * Most of the eye complications connected with the nose result from acute or chronic suppuration of the paranasal sinuses, but some of the more interesting ones may follow acute inflammatory processes with little or no pus."

As to the *type of operation*, the one which is advised, and seems in every way sufficient to ventilate and drain the sinuses adjacent to the optic nerve, is a modification of what Hajek and Skillern designate as the *radical sphenoid*. In their radical operation there is an exenteration of all the posterior ethmoids and the sphenoid and also the complete removal of the middle and superior turbinates. In the method I advocate, only enough of the turbinate tissue needed to *obtain access* to the front wall of the sphenoid is removed. The nasal portion of the anterior sphenoidal wall is taken down and

only the posterior ethmoid cell opened. To my mind there is no indication for exenterating the ethmoids unless they are so diseased that they need removal irrespective of the visual disturbance. The ventilation and depletion incident to the operation outlined will relieve the pressure and infection about the nerve. This will *neither unnecessarily* imperil the life of the patient *nor injure* the function of the nose. In none of the cases followed has there been any crusting or dryness, the patients almost invariably testifying that the side operated on was much better than the other, this doubtlessly being due to the removal of the middle turbinate.

While I do not feel that one would be justified in doing a complete sphenoid and ethmoid exenteration, unless marked pathology was evident, it should be said in fairness to those advocating such an operation that it would relieve the engorgement.

That this advice may not be considered too conservative, let me quote Skillern in an article discussing operation on the ethmoids:

"In the uncomplicated cases of purulent ethmoiditis without polyp formation after the removal of the middle turbinate, the results obtained are usually inversely to the extent of the surgical disturbance; in other words, the greater the operative interference, the less likelihood of return to normal and ultimate cure. Experience shows that once the middle turbinate is disposed of, the ethmoid labyrinth lends itself to conservative treatment and responds correspondingly with much greater facility than heretofore. In addition to this, the relations having been undisturbed, the ethmoid capsule and cells remain uninjured and intact. After a week or ten days, in how much more favorable a position are we to study and treat the pathological process, not to mention the benefit derived from the aeration and drainage effected by the turbinectomy. The infection will have a tendency to limit itself to one or a small group of cells which only the most careful and persistent study will disclose. This being finally accomplished, it is a comparatively easy matter to install a large opening in their most dependent parts with a suitable hook, thus permitting aeration and drainage which, coupled with irrigation, soon eliminates the active infection and puts the parts on the road towards resolution. In this instance the actual surgical interference has been small; therefore, the function of the nose will be unimpaired and the cure may be termed physiological, as well as therapeutic, leaving nothing to be desired. * * * Operative procedures upon the ethmoid, unless slowly, carefully and systematically carried out, are most apt to spell disappointment and radical operations upon this structure do not by any means always end in radical cures."

"The sphenoidal cavity after the radical operation becomes more or less filled with granular tissue," and he adds that he has never seen a dry nose follow, no matter how extensive the procedure. As to the value of the operation, mention is made of the dramatic results obtained where grave cerebral and orbital symptoms have threatened. Many cases of progressive blindness have been reported which recovered their vision. He adds that "on account of the almost uniformly brilliant results obtained and its comparative freedom from danger, it must be classed as a procedure that no rhinologist of the present can afford not to master."

With reasonable care this semi-radical sphenoid operation should not be a dangerous one. It is of the greatest importance to work in a dry field. To try to keep one's bearings in a nose filled with blood and debris is a foolish and unnecessary risk. There is no hurry. If the case warrants operation, it by all means warrants a careful, painstaking technic. Dr. Harvey Cushing takes his time when he opens a brain or does a trans-sphenoidal pituitary. Every bleeding vessel is controlled so before he advances he has a perfectly dry field. Now, if Dr. Cushing, with his consummate skill and wonderful knowledge of the position of each structure reached, takes such infinite pains to obtain a good exposure and a dry field, it behooves us, as rhinologists with but limited ability, to be at least equally painstaking in whatever we attempt. The care he takes is most instructive, not only as he advances, but as he finishes his operations, he, himself, drawing together step by step periosteum, muscle, fascia and skin so that primary union is so perfect that one can scarcely detect the line of incision.

As to anesthesia, it is perfectly easy in most cases to do all that is necessary under local. A preliminary subcue of scopolamin 1/100 and morphia 1/6 will wonderfully quiet most of the timid ones. A general anesthesia can, of course, be given if the operator so desires.

The method of operating and the instruments used are largely matters of individual preference. Personally, I remove the middle turbinate, or as much of it as is necessary to gain access to the sphenoid, by incising it below and anteriorly with a Sluder knife, then severing its outer attachment with middle turbinate scissors, followed by snare, and finally removing all fragments and occasionally portions of the superior turbinate with biting forceps. It is especially important to freely expose the front wall of the sphenoid. Then the Sluder's sphenoid knife, with point downward, is passed along the cribriform plate until the front wall of the sphenoid is reached high up. Downward pressure easily forces the knife through this anterior wall. By this method one is working away from the brain and never toward it. With two or three strokes downward

and then two or three outward, the sphenoid is sufficiently opened to permit inserting an antero-posterior pair of biting forceps with which the anterior wall is quickly removed. The posterior ethmoid is uncapped with a curet. Don't meddle with the lining membrane of either the posterior ethmoid or sphenoid. Simply sop out the blood, preferably with absorbent cotton, *and by no means pack the nose.*

As to the fifth subdivision, fatalities, these will have to be considered on theoretical grounds as my operative cases have all survived.

In order to point out the special risks incident to nasal operations on cases with brain tumors, Dr. Harvey Cushing showed a case of meningitis at the last meeting of the New England L. & O. Society where death followed shortly after. The patient had an acoustic tumor accompanied by marked hydrocephalus, which was not recognized as the cause of his failing sight, although he had been examined by several competent eye men and at least one neurologist. Several intranasal operations were performed without relief, and Dr. Cushing eventually saw him and removed the tumor.

In nearly all these brain cases the increased intracranial pressure produces a thinning of the bones adjacent to the dura, and the accessory sinus walls are involved in this process, so that any operation tending to weaken the support of the brain is dangerous. The removal of the wall between the ethmoids and the nares, or even the breaking down of the cell partitions, would naturally weaken the support somewhat so that the dura might be forced into the nasal cavity, as happened, I understand, in this case some months after the nasal operation.

Operations in the region of the cribriform plate are not entirely devoid of danger. They presuppose on the part of the operator an intimate knowledge of the anatomy and relations of the structures. Unless one has had experience in opening the sinuses in cadavers, I do not think he really appreciates the size of these cells and the thinness of their walls. As previously intimated, the ethmoid exenteration (unless warranted by marked pathology) adds considerably to the dangers. It is here that the infection to the meninges probably originates, especially where these sinuses are not walled off from the dura. There is a certain element of danger in opening healthy sinuses, as post-operative infections not infrequently follow, because one is never working in a sterile field. The traumatism incident to a complete ethmoid exenteration is more extensive than that by the minor procedure advocated, and the possibility of

breaking through the cribriform infinitely greater. With the possible exception of the cavernous sinus and the optic nerve, there is no structure that is apt to be injured in opening the sphenoid and the mere uncapping of the posterior ethmoid. It has seemed to me, as I have learned of these fatalities, that they probably resulted from an unnecessarily radical procedure. Unless one is accustomed to work in the accessory sinuses it would probably be better to remove the middle turbinate and let the sinuses alone, or do as I at one time advocated, a three-step operation:

1st: Removal of the middle turbinate;

2nd: Opening of the sphenoid;

3rd: The posterior ethmoid.

This procedure offers the maximum of safety. The individual operations are so minor that there is but little reaction and all can be done quickly and under local anesthesia. But in cases where it is necessary to speedily relieve the engorgement about the nerve, this three-step procedure might not do this soon enough to prevent atrophy. This method may not appeal to the skilled operator, but for one unaccustomed to this type of intranasal work, it offers the maximum of safety, as doubtless many cases would improve by simply removing the middle turbinate, and it might not be necessary to open either the sphenoid or ethmoid.

That unnecessary fatalities may be prevented it is imperative that the operator should learn the proper technic, which he cannot do unless he works it out on cadavers. It is inexcusable for anyone to attempt this work unless thorouhly qualified.

The criticism has also been made that because certain rhinologists know how to do an exenteration of the ethmoids, they think they find sufficient evidence in these cases to warrant this operation. There is an element of truth in this accusation, I suspect, as it but too frequently happens that a specialist only sees what is within his own domain and has but little comprehension of the other great fields in medicine and surgery. It is, therefore, most urgent that he should familiarize himself with the work being accomplished in these other fields so that he may become an intelligent co-operator. He should be cognizant of all the other causes for loss of vision and exercise his best possible powers of discrimination in arriving at the diagnosis. The safety of the patient, as well as the safety of the eye, require well balanced judgment. There is a time for action. There is a time for conservatism. When action is necessary, let not the life of the patient be needlessly imperilled.

A detailed report of the four following cases is appended, the numbers used representing a continuation of the cases previously published:

Case 26: Mrs. N. W., aged 48, referred from the Eye Clinic of the Infirmary, May 12, 1920, by Dr. Ralph A. Hatch, with diagnosis of retrobulbar neuritis, right, of four days' duration, vision fingers over a small area on temporal side close to eye, large central scotoma. With the exception of severe headaches about every two weeks over frontal and temporal region, which she has had as long as she can remember, history revealed nothing important. She has not been especially subject to colds. The patient on awaking noticed that the eyesight in lower half of right eye was gone. This spread so that within 48 hours there only remained a small area of vision on the temporal side. On looking straight ahead pain was experienced through the right temporal region. The eye was also sensitive to pressure. A month ago patient had a severe cold, from which she has not entirely recovered. Nasal examination disclosed an enlarged and obstructive middle turbinate. The X-ray showed slight cloudiness of right ethmoids and sphenoid which suggested thickened membrane. The fundus was practically normal. Neurologic, dental, physical and Wassermann negative.

The usual operation under general anesthesia. Middle and superior turbinates found considerably hypertrophied, the latter obstructing drainage. The cell linings were red and thickened. No secretion was seen. Dr. Jonathan Wright kindly examined the section from this case and reported that the mucosa itself presented evidence of sub-acute inflammation, and that there was also a rather marked fibroblastic increase along the margins of the bone areas and that the nuclear elements of the bone itself were numerous and deeply stained. O.im.1/12 confirmed the conclusions that there was an inflammation of bone here due to some morbid activity. The vision returned rather slowly. At the end of a week fingers 1 foot in front of the eye; at the end of 5 weeks 20/40 right and 20/50 left, which probably represented her previous vision. There was some pallor on the right nerve. On January 13th, *i.e.*, eight months after the operation, Dr. Hatch reported v.o.d.20/60—2 letters, and v.o.c. 20/40—2 letters; right nerve head shows pallor of temporal 2/3. There remains an oval opening in the sphenoid; nose free from crusts or secretion; headaches greatly relieved, both as to frequency and severity. The neurological tests given elsewhere in this paper were practically negative.

Case 27: E. C., a girl of 15 years, referred from the Perkins Institution for the Blind, on January 19, 1920, by Dr. W. F. O'Reilly, with diagnosis of double optic atrophy, following optic neuritis. His letter, which follows, gives an excellent history of the case:

"She came to me July 16, 1916, with a history of five days ago having a blurring in the right eye and losing the sight of it shortly after. At that time she had perception of fingers only. The nerve head showed a piling up, there was no detachment, no signs of hysteria. She had contraction of the visual field, especially down and out. Diagnosis, optic neuritis. Her left eye had normal vision and negative fundus findings. Her nose to me was negative. I could find absolutely nothing in the history to help me out etiologically and referred her to Dr. Harvey Cushing. I believe she was taken into the Peter Bent Brigham Hospital, put through all the tests, general and local, and as I recall it, in a conversation with Dr. Cushing, he told me he could find no causal factor in her case. Although I cannot say positively, I believe the sinuses were excluded. On this New Year's day she came to me and the minute I saw this 16-year old girl amblyopic in both eyes, to say the least, I received a shock. My prognosis at the time to the father was that the other eye would not be affected. Of course, I know that is not in keeping with the retrobulbar neuritis of other than nasal origin. She came this day because of some symptoms that the mother suspected of nasal obstruction and it was forcibly brought to my attention whether there was an obscure lesion in the nasal sinuses. It was not discerned by me or at the Brigham Hospital, or at the other institutions, or by the other men whom she saw after seeing me for the last time in 1916. I understand during that time she has been at the Carney Hospital and at the Boston City Hospital. During her stay at the latter, a period of about two weeks, she became blind in the left eye."

At the Brigham Hospital, where she was a patient from July 23d to August 2d, 1916, a diagnosis of retrobulbar neuritis was made. The following extracts are taken from the excellent record of this case:

"One week before admission could see figures across the street, but on admission could only distinguish between light and darkness in the right eye. Had daily headaches about right eye and may have had a slight cold. Previous to this never had any pain over her sinuses. *Pupils:* Right larger than left, each round, regular and reacting to light. *Nose* shows no external deformity or obstruction to breathing. *Roentgen* report showed negative findings. The *fundi: o.d.:* disc hyperemic and injected with vessels engorged and tor-

tuous. Nasal margin of disc obscured. Optic cup and lamina not visible because of edema. No measurable elevation. Periphery clear. *o.s.:* Picture not so marked as in o.d., but otherwise the same. Nasal margins not hazy. A complete neurological examination is entirely negative with exception of fundi. No involvement of any other cranial nerves. No cerebral or cerebellar signs. *Reflexes* normal."

A note by another examiner was as follows: "v.o.s.20/20 v.o.d. nil. o.d. Optic nerve inflammed. Interstitial elevation of disc above margins which are not elevated, but slightly edematous. Optic cup has become a hillock with increase of fine vessels and injection. Same condition o.s., but much less marked."

The Wassermann reaction was negative. On discharge ten days after admission, the note made was as follows:

"The optic neuritis is the only neurological condition found at the present time. Her condition did not change in any respect during her time at the hospital. Advised to return for observation after one or two months, or sooner, if any further symptom developed."

The sight of the right eye never returned and within a short time she lost even light perception. About nine months later this girl was a patient in the neurological department of the Boston City Hospital (from March 9 to 21, 1917), where a diagnosis of double primary optic atrophy was made. The X-ray of the sella turcica was negative. An important symptom was noted that the patient had pain in the left eye and some headache which came on with the loss of vision and persisted while she was at the hospital. A note was also made that the sight had gradually failed while there and that when discharged, the outline of only large objects were distinguishable. The left disc was blurry in appearance. All tests, physical and neurological, were negative. No note was made as to the nose or the accessory sinuses and no fields attempted. This poor child left the hospital practically blind. What little vision she had in her left eye faded away so that at present even light perception is doubtful. At neither institution was any attempt made to relieve the optic neuritis by draining the accessory sinuses, and the neuritis was shortly followed by optic atrophy.

As the doctor referring to her said, the patient was complaining of some blocking of the nose, and to quote from his letter again:

"In view of what you have written and because I have seen cases which have brought your observation forcibly to my notice, I thought from the moral side, if from no other, you should see the case. Un-

questionably she now has optic atrophy in both eyes and, of course, according to what you and I know, the case is beyond hope, nevertheless, there are some things that up to the last few years we have not known and I feel from the circumstances that I have detailed above that you should see the case."

I noted a slight deflection of the septum to the left which extended far back, crowding somewhat the large unhealthy middle turbinate on that side. The right middle turbinate was also enlarged, soft to the touch and about it there was considerable secretion. Both middle turbinates without doubt obstructed the posterior sinuses. One cannot tell how much change had taken place in these turbinates in the three years since the trouble started. Very probably there was some obstruction at that time, even if not detected. The patient was again seen on January 12, 1921, and the following notes made:

"Has been well with only a slight cold, after which there is always a good deal of secretion from which, as a matter of fact, she is never entirely free. Has pain in head at times, but the ache is always in the eyes. Dr. Ralph A. Hatch examined the eyes and reported: 'A case of optic neuritis followed by atrophy; right pupil larger than left and does not react to light; left pupil slight reaction. Vision right eye nil; vision left eye light perception doubtful. Both nerve heads perfectly white; arteries small; disc margins clearly defined.' That I might verify my own findings, I asked Dr. John H. Blodgett to examine the nose and he reported: 'Left middle turbinate is abnormal in size, unhealthy color and superior portion of nose unusually narrow, giving the impression that there was considerable pressure and blocking to the ethmoidal labyrinth. The right middle turbinate, anterior end, seems broader and thicker than left and presses against the septum. Impossible to get a small applicator between septum and anterior end of turbinate. There is extreme pressure by both middle turbinates against the outer wall and very little opportunity for drainage of any secretion that might be dammed up in the ethmoidal labyrinth or sphenoid.' As he saw the nose after two hours' cocanization, it was most favorable for examination.

Before dismissing this case let me quote the following:

In Paul Roemer's text book of Ophthalmology, in speaking of the etiology of optic neuritis, the writer says:

"The question whether a disease of the accessory sinuses is present, especially of the posterior ethmoidal cells or of the sphenoidal sinus, is *very* important. The optic neuritis caused in this way may affect either one or both eyes. Frequently the trouble begins with an acute disturbance of vision, usually a central scotoma, after which

the neuritis appears. When we can find no *plausible and satisfactory* explanation of an optic neuritis the *accessory sinuses must be* carefully examined, for in *many cases immediate* operative treatment can save a part of the vision."

Let me also quote from De Schweinitz on Diseases of the Eye, 8th edition, page 475:

"The prognosis of optic neuritis depends upon the cause and the duration of the process. If the focus of disease, for instance, in the accessory sinuses can be removed, vision may be saved and edema and inflammation will subside. *Untreated optic neuritis almost always produces blindness.*"

Case 28: Miss L. W., aged 26, referred by Dr. Henry Hawkins on June 23, 1920, to determine cause of severe pain extending from the frontal to the occipital region. She was in poor health, having been under the care of Dr. Robert Soutter for four years for injury to the spine, which was followed by a low grade tubercular infection. The appendix has been removed and for some years there has been albumen and casts in the urine. She gave a history of always having had pain in the back of her head. Three months ago following a severe cold her eyes were blurry for two or three days and sensitive on pressure or movement. Nasal examination revealed marked deflection of the septum to the right, but the turbinates did not appear especially hypertrophied or obstructive, and no evidence of accessory sinus involvement could be detected. The vision not being affected at this time and nothing found in the nose to account for the headaches, the patient was not seen again until October 6, 1920, when she gave a history of having had a second attack of retrobulbar neuritis during my vacation. This was preceded with increased pain through the eyes and discomfort on movement, vision 20/200 right. The fundus was normal in appearance. There was a central scotoma. X-ray and Wassermann both negative. She was a patient at the Massachusetts Charitable Eye and Ear Infirmary eleven days and was about to be operated upon when the vision commenced to improve, and when I saw her was about normal. There has been one or two periods of slight blurriness since then. Were she in good physical condition it would be advisable to correct, at least, the septal deformity; but as her history and the dullness at the apex of the right lung found on examination at the Massachusetts General Hospital suggest the possibility of tuberculosis, it was deemed safer to adopt local treatment and general medication. Under these she has slowly improved.

Case 29: Mrs. M. M., aged 26, a patient of Dr. W. Holbrook Lowell, was seen at the Massachusetts Charitable Eye and Ear Infirmary on January 12, 1921; diagnosis acute retrobulbar neuritis, right, vision 20/200. History of pain, sensitiveness and blurriness of right eye for past ten days. There was a sensation of lameness when the eye was moved up or down. Fundus negative. No evidence of optic neuritis. The nasal examination revealed septum in median line and inflammed middle turbinates. They shrunk, however, under cocain to the normal size and as they did not seem to be especially obstructive, the prediction was made that recovery would probably take place without operation. The X-ray showed slight blurriness of the ethmoids. The medical, dental, neurological and Wassermann were negative. On January 29th, the eye was found to be improving slowly,—vision 20/40. The Peter Bent Brigham Hospital examination was negative. The right middle turbinate hung free from the septum and appeared of normal size and but slightly, if at all, obstructive. On February 8th, Dr. Lowell reported vision 20/30+. There did not seem to be enough obstruction to the posterior sinuses to warrant the removal of the middle turbinate. Should there be recurrences this would be indicated. This is a case for observation and represents the type where spontaneous rcovery may be anticipated.

SUMMARY.

I: A careful differential diagnosis should be made in every case, but in the subacute or chronic forms it is of the utmost importance to rule out central lesions and toxic infections.

II: While a certain proportion of cases recover either spontaneously or under treatment, permanent blindness may result in others unless they receive prompt surgical interference. The size and position of the middle and superior turbinates determine largely the question of recovery with or without operation, and when found to be blocking the ventilation to the posterior sinuses, they should be removed.

III: The opening of the accessory sinuses for sudden loss of vision after the exclusion of other causes has been advocated by many investigators even with negative nasal findings. The fact that nothing is found either on inspecting the nose or by roentgenograms does not prove that there is no infection in the nose. It simply means that it cannot be detected. If the loss of vision is due to the accessory sinuses, there is pathology, but it may be located so far within the nose as to escape detection. As the inflammation incident to this infection is frequently of the exudative but non-suppurative

type, the roentgenograms are practically negative. A more careful timing of the plates has shown a slight cloudiness in some, so there is hope that this bugbear of negative nasal findings will soon be eliminated.

IV: The complete ethmoid exenteration is not only unnecessary, but actually contraindicated, unless there is sufficient pathology in the ethmoid labyrinth to warrant it, irrespective of the loss of vision. The semi-radical sphenoid procedure which is advocated is one practically devoid of danger and can be performed under local anesthesia. It, in no way, impairs the function of the nose or needlessly imperils the life of the patient. It sufficiently ventilates and drains the regions adjacent to the optic nerve. Should, however, the visual disturbance be due to toxemia from some other sinus, or from teeth or tonsils, these foci of infection should receive attention.

V: While it is well to emphasize the dangers of this or any operation in the hands of the unskilled, the fact *is,* this sphenoid operation is frequently performed for much less serious complaints than loss of vision.

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REPORT OF A CASE OF AIR EMBOLUS BY WAY OF THE LATERAL SINUS—REACTION AND UNTOWARD RECOVERY.

Dr. Samuel S. Quittner, Cleveland, Ohio.

Mrs. Y. W., age 38, was operated for a radical mastoid, September 23, 1920. Previous history indicated the right ear had discharged continuously for at least the past six years. The cause was a "cold."

The present history giving indication for operation was noises, dizziness and pain in the region of the right ear for eight weeks. Examination previous to operation disclosed a fair sized polyp in right external canal, small amount of foul discharge, slight temperature.

Operation. The first blow of the gouge, uncovering the mastoid cortex, also uncovered the lateral sinus. The sinus was very superficial and well forward. It was then uncovered for about one-half an inch, but no necrotic bone granulations or pus was in evidence. The surrounding bone was dense. It was observed that possibly sinus had a rather dull appearance, but as nothing warranted any suspicion, this area was given no further thought. The necrotic area was in and around the antrum. The operation was concluded in the accepted manner. Packing was gentle in the sinus area. Posterior wound was closed.

Subsequent history until October 7th, showed an uneventful recovery, with temperature never rising above 100° (same as day of admittance). The packing was removed four days following the operation by way of the external canal and then renewed. This was repeated each day, loosely and gently in sinus area. On October 4th, the patient was up and around and ready for discharge.

October 7th, at 10 A. M., two weeks after operation, with patient sitting on a chair, the packing was removed for daily dressing. There was a sudden large gush of blue blood from the external canal. A hasty repacking took place, especially posteriorly, and hemorrhage was controlled. In the meanwhile the patient said, "I hear awful noises—I am getting dizzy." Her face became blanched, the pupils dilated widely and she fell against the bed, unconscious.

(Not being able to comprehend this sudden hemorrhage [various possibilities flashing through my mind] or to understand her evident

distress, while the blood was still gushing, I placed my ear to hers and distinctly heard a hissing noise. Instinctively, of course, I hastily repacked as a first resort.)

She was raised and laid flat on the bed and in from three to five minutes her color returned, pupils contracted and except for a complaint of extreme weakness and nervous excitement was soon herself. She was advised to rest flat on her back.

That night at 11 o'clock, the interne on service called me up and stated that the patient had had a severe chill for about twenty minutes, followed by a rise in temperature (by mouth) from normal to 103°, pulse 120, respirations 38. I advised preparation for an exploratory operation in the morning. That night the temperature receded and was 100° at 8 o'clock the next morning.

The explanation of the gush of blue blood, the evident hiss that I heard, the sudden prostration of the patient could be accounted for, it was felt, in only one way: by a break in the lateral sinus wall and a subsequent air embolus, although it was hard to conceive how loose packing at that late day (after repeated daily packings) could have caused same. The dull appearance of the sinus at the time of the operation was recalled and its possible friable nature deducted.

During consultation, the patient had another severe chill and temperature rapidly arose to 104°, pulse 125 and respiration 36. The question now arose that with this clinical picture, was there a lateral sinus thrombosis? That lateral sinus was involved was evident by the typical circulatory disturbance. But to presume a latent thrombosis as an explanation of chill and high temperature, sudden rise or a sudden thrombosis after the break in the sinus only twelve to twenty hours before seemed unreasonable. There had been no clinical evidence at any time previous to present trouble outside of the questionable appearance of the sinus wall at the time of operation. I suggested that with the air embolus it was entirely possible that septic or protein matter had been sucked into the circulation, and this chill and temperature rise was an anaphylactic reaction. It was then determined to wait another twenty-four hours before exploring sinus. The suggestion was correct, for the patient never had another reaction. The temperature rapidly returned to normal and remained so. A blood culture report, October 11th, was negative as to growth. The patient was discharged from the hospital in six days, none the worse for her delayed recovery. Subsequent history to date is negative.

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A DOUBLE SIGMOID PORTION OF THE LATERAL SINUS.*

Dr. John Mackenzie Brown, Los. Angeles.

Variations of the lateral sinus and especially those regarding the reduplication of all or part of it are fairly rare, as only a few references are found in literature. Hahn, in 1914, studied the question of double lateral sinuses, and collected a series of thirteen cases. In his series only one case is mentioned as having a double sigmoid portion. The following cases were collected and reported by him:

Knott: One case in which a horizontal septum divided the sinus for a portion of its length. He also states that he has seen a case of diminutive size of the right lateral sinus and one case of complete absence of the left lateral, as far as the usual point of entrance of the superior petrosal sinus. The continuation of the latter with some small tributary veins formed a diminutive representative of the lower part of the sinus. Knott also mentions a case where both lateral sinuses were very small and the occipital and marginal sinuses being very large. Henle alludes to this abnormality. Sperino reports one case in which he found the horizontal portion of the lateral sinus double for one and one-half centimeters. Streit reports ten cases of double lateral sinuses collected from reports by Hallett, Meckle, Dumont and his own. Six were on the left side and four on the right. Streit's own case was one of a double sigmoid. He states that the vessels were separated by a ridge of bone, but does not mention anything about the length of the double portion, nor the exact position, except that it was found in the sigmoid portion. Heine, during a mastoid operation on a boy thirteen years of age, observed a double lateral sinus. At autopsy he found two distinct segments of the sinus. They were separated from each other by a distance of 12 mm. The two segments were about equal in caliber. The exact location of this duplication is not mentioned. Beyer, during a mastoidectomy on the right side in a boy twelve years old, noted a double lateral sinus.

The specimen represents a section of the left half of the occipital bone and the petrous portion of the temporal bone. The occipital bone was not cut in the median plane posteriorly so the proximal

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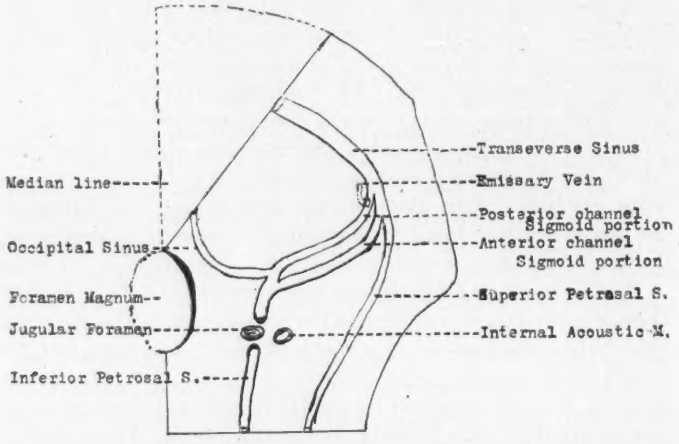
portion of the lateral sinus is wanting. The caliber of the left lateral sinus is apparently normal and has a total length of seven centimeters. As it approaches the asterion (junction of the occipital, temporal and parietal bone) it makes a gentle curve anteriorly and downward, at the distal half of the curve the lateral sinus divides into two parts, and the two channels are separated from each other by a ridge of bone. The distance between the duplicated channels of the lateral sinus is eight millimeters; they are parallel to each other and again unite just as the jugular foramen is reached. The length of the duplicated portion of the lateral sinus is approximately four centimeters, no appreciable difference in their caliber is noted. The superior petrosal sinus terminates at the point of division in the channel lying most anteriorly. From the floor of the posterior channel an emissary vein is given off and leaves the skull through a small foramen



in the occipital bone. The left occipital sinus empties into the posterior channel near the point of union of the two duplicated portions of the lateral sinus. (See Fig. 1.) The duplicated portion of the lateral sinus overlies the mastoid cells. The channel more posteriorly overlies the posterior margin of the mastoid cells while the channel more anteriorly overlies the main portion of the mastoid cells. The course of the occipital sinus is abnormal, as it lies more lateral to the foramen magnum than usual, its termination is also unusual, as it empties into the posterior channel of the duplicated lateral sinus instead of the proximal part of the lateral sinus. Both the superior and inferior petrosal sinuses are normal in their course and ter-

mination. The sigmoid portion of the lateral sinus is duplicated and represents that part lying between the superior petrosal sinus and the jugular foramen.

The following summary of the development of the venous sinuses of the dura mater is largely based on the work and observation of Streeter and Mall.

The early drainage of the head consists of a primary head vein, which lies on the lateral side of the brain stem. It originates principally from three capillary plexuses, passes in a caudal direction along side the brain stem and terminates in the duct of Cuvier. The capillary plexuses on either side of the brain are designated as the anterior, middle and posterior plexuses. The primitive head vein as well as the plexuses play an important role in the development of the dural channels. As the otic vesicle develops, the primary head vein is deflected in its course, and soon becomes obliterated in this region. To accommodate this adjustment an anastomosis takes place between the middle and posterior capillary plexuses. This anastomosis between the two lateral plexuses represents the anlage of the sigmoid portion of the transverse sinus. The main stem of the middle plexus develops into the permanent superior petrosal sinus. An anastomosis also takes place between the anterior and middle capillary plexus, so that the only remaining part of the primary head vein is to be found lying anteriorly to the otic vesicle which develops into the cavernous sinus and caudally where it passes through the jugular foramen to become the internal jugular vein. In an embryo 21 mm. long the sinuses of the head have acquired essentially all their connections about the otic vesicle. Streeter has followed out the development of the sinus in six embryos, varying in size from 4 mm. to 80 mm. in length. In this series he finds that the primitive veins change their position for two main reasons: the first is due to some flexion of traction force acting upon the vein. The second is due to a spontaneous migration where there is a change in the position of the blood stream only by an anastomosis the blood stream develops a new channel in the adjacent loops of the plexus with a corresponding dwindling of the previously used channel.

To explain a double channel in the sigmoid portion of the lateral sinus from an embryological or developmental viewpoint seems plausible, if we keep in mind the mechanics involved in the formation of the venous sinuses. The sigmoid portion develops by a process of migration; that is, subsequent channels forming in new loops of capillary until a mechanical equilibrium is reached. As the growth of the head continues, an adjustment of the dural channels is neces-

sary to accommodate the new structures. It is probable that during the shifting of the position of the sinus that a double sigmoid evolves; that is, a new venous plexus develops before an old channel is completely abandoned. Under ordinary circumstances the old channel disappears when a new channel is formed. But in a case like this specimen the old channels persisted as well as the new.

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LUNG ABSCESS FOLLOWING TONSILLECTOMY. REPORT OF A CASE WITH BRONCHOSCOPIC AND X-RAY FINDINGS.

Dr. Irving Wilson Voorhees, New York City.

Lung abscess is one of the accidents of tonsil surgery,—one of the tragic accidents. The results of the removal of tonsils and adenoids are so uniformly good, considering that every one who claims the right or title to practice medicine in any form, "does tonsils" that we have come to expect 100 per cent of successes. This in the nature of all mundane things is an impossibility. We are entitled to at least 1 per cent of failures;—in any case, we are going to have that many or more. It is safe to say that every rhinologist in active practice for ten years has done a thousand tonsils. Most of us have had no bad accident, but if we keep on in this work, the law of averages is going to see to it that trouble comes to us. Most of us are afraid of criticism and we report, therefore, only our glowing successes. We may feel, with the author of Ecclesiastes, that in the making of many books, there is no end and that much reading of medical journals is a weariness of the flesh, but the best book that ever will be written for physicians is a book that will record our collective disappointments and blunders and unfortunate experiences,—a sort of physicians' Bible, which would be as well known as the famous Rembrandt's "Lesson in Anatomy," and certainly a great deal more studied. That book will never be written for obvious reasons, and yet if it could be written it would surely be the one "best seller."

The report of this case will begin with the notes made by Dr. Catherine R. Kelley of this city, who referred the patient to me.

M. F., aged 29. First seen Oct. 4, 1919. Family history: Has no bearing on her complaint. Past history: Scarlet and diphtheria in childhood with normal recovery. Menstruation at 15. Regular, 3 to 4 days. Profuse. Pain before with frequent headaches and backaches. Headaches take form of pain behind ears, worse and

more frequent following strain or overwork. Constant cough for several years. Appetite poor. Sleeps poorly, dreams much. Bowels regular.

Present Chief Complaint. In July, 1919, began to suffer severe attacks of "asthma" and rhinorrhea. A rhinologist removed polypi(?). No relief. She feels tired all the time. Best weight is 134. Physical examination. Fairly well developed and nourished. High strung, nervous. Voice nasal. T., 98.6; P., 80.; Wt., 127½; Hb., 80%. Tongue clean. Teeth good,—some crowns. Tonsils enlarged and probably diseased. Eyes, slight exophthalmos. Heart shows slight enlargement to left, but sounds good, no murmur. Blood Pr., 108. Lungs have rough bronchial sounds over right upper. No rales. Abdomen negative. Urine negative.

Patient was seen three times at intervals of a week or more. Meanwhile her general condition had improved and she was, therefore, referred to Dr. Voorhees for her nose and throat.

Notes made by Dr. Voorhees: History of almost constant nasal discharge. Has had three severe attacks of what she thinks is "asthma." Some days she uses a dozen handkerchiefs, the next day none. Occipital headaches and nuchal pains, worse when nervous. At times a heavy yellow discharge stiffens her handkerchiefs.

Examination shows hypertrophy of both inferior borders of both inferior turbinates running straight back to large posterior tips. No adenoids, but tonsils contain cheesy masses. There is no manifest sinusitis, but it is probably present. Over the chest there is a peculiar redness which does not entirely disappear under the finger. This, she says, is worse when she is nervous and during the asthmatic symptoms. X-ray of head. Right ethmoids show granulations or pus. Same for right antrum. Frontals (?).

Treatment. Both posterior tips were easily removed early in January. No anesthesia. On January 26th, she was admitted to the Manhattan Eye, Ear and Throat Hospital. Ether anesthesia. Post-nasal plug. Fracture of right inferior turbinate upward so as to get it out of the way,—no part of it was removed. The usual naso-antral opening was made. No free pus. Gran. tissue only. Tonsils then removed by Sluder method with suction, ether being continued by the mouth hook under pressure. Amount of blood lost is insignificant. Time consumed in operating room, 20 minutes. Post-nasal plug removed. Patient to her room. Came out nicely in 30 minutes. Coughed as usual. The following day she went home.

Seen by Dr. Kelley at intervals from January 27th to February 6th. On this date she came to Dr. Voorhees' office. Normal looking wounds. She feels much better.

She then went to a new place of business, where she unpacked goods and worked hard all day in a cold room. That night she had a violent pain in right chest, cough and temperature of 102. Dr. Kelley found slight dullness in right upper chest, absence of breath

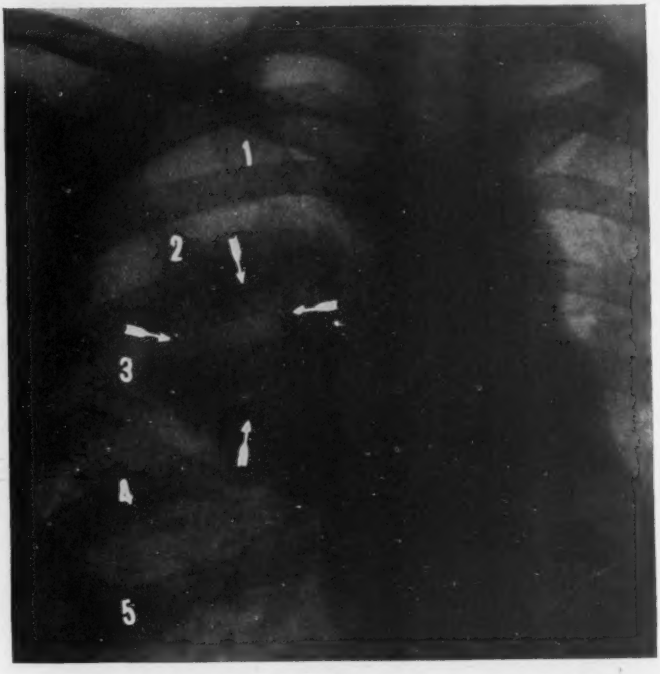

Plate I.

Abscess Right Lung (Ant. View), Feb. 21, 1920. Very opaque area of increased density at right hilum. Diameter about 3 inches. Center shows lessened density. Possibility of incomplete pneumonic consolidation with partial central resolution. (X-Ray by Dr. Lewald.)

sounds, diminished breathing below the second rib right side. Two days later is comfortable. Paroxysmal cough still distressing but pain is gone. T., 100.2; P., 80.; R., 30. Dullness at right second and third ribs ant., with diminished breath sounds and some fine moist rales. Below this area is normal resonance but very distant voice and breath sounds. Did well for next four days. Staid in bed with average T. of 100. Cough improved and general condi-

tion seemed satisfactory. On February 13th, she had again violent cough and foul expectoration which left "a very bad taste in the mouth." Pain in right chest. Physical signs similar to above. Lung abscess suspected. Dr. Voorhees called in.

On February 17th, she is roaming about her bed coughing constantly and only with the greatest effort raising a small quantity of

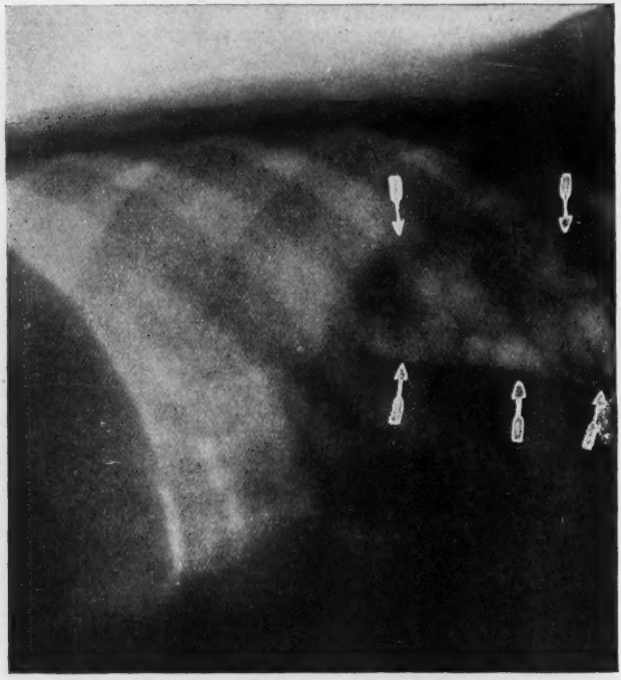

Plate II.

Lung Abscess. Lateral Decubitus. Note Fluid Level. Feb. 27, 1920. Patient lying on left side. Definite fluid level filling one-half the area of lessened density in right lung. Distinct area of peripheric density about 1 cm. diameter (Capsule?). Remainder of right lung apparently normal. Nothing in left lung. (X-Ray by Dr. Lewald.)

foul sputum. Examination of chest confirms Dr. Kelley's suspicion of lung abscess, probably in right middle lobe.

Through the kindness of Dr. T. H. Allen, we were able to get the patient into St. Luke's Hospital on his service in the private pavilion.

St. Luke's Hospital notes: M. F. No. 141234. Age 29. Attending, Dr. T. H. Allen. House—Dr. Post. Admitted Feb. 21st.

Dismissed Feb. 27th. Result unimproved. Diagnosis—Abscess of right lung. Chief complaints: 1. Pain in right chest for three weeks. 2. Cough for three weeks. 3. Sputum purulent and offensive for 10 days. Past, present and family history as above noted. Exam. of chest. Dullness right lung post, from hilum toward axillary border. Voice and breath diminished. Heart and abdomen negative. During her one week stay in the hospital, patient's temp. ranged from 100 to 104 (rectal). Pulse 90 to 110. Resp. averaged 35. She was quite uncomfortable most of the time with persistent cough and foul sputum. Slept poorly even with repeated doses of morphin, alternating with heroin and veronal. Chest pain severe. Appetite poor. Very little nourishment. She was apparently in a very exhausted condition. *X-ray.* February 21st. Very opaque area of increased density region of right hilum extending towards axillary border for about three inches. Shadow is about 3 inches in vertical diameter. Its center shows areas of lessened density. The process may be due to incomplete pneumonic consolidation with partial breaking down in the center. No definite fluid level is seen.

February 27th. Plate made with patient lying on left side. A definite fluid level fills about one-half the area of lessened density in the right lung. This confirms the diagnosis of abscess of the right lung. The plate taken in the prone position shows the area of lessened density on the right to extend from the hilum to about two-thirds distance to the axillary border, and from the shadow of the fourth rib to seventh rib posteriorly, and from the first to the fourth rib anteriorly. (*Signed*) L. T. Le Wald, M. D.

There is a distinct area of density outlining the mass about 1 cm. in diameter. No gross lesion is shown involving the remaining portion of the right lung. No definite infiltration of the left lung.

Laboratory report. R.B.C., 3,500,000. Hb., 67 per cent. W.B.C., 24,000. Polys., 90 per cent. Lymphs., 10 per cent. Urine, S.G., 1020. Alb. faint trace. Many leucoeytes and epith. cells. A few gran. casts.

Sputum, Feb. 22nd, 1920. Numerous organisms. Many gram positive cocci, round and oval. Single, in pairs, and a few short chains. Many gram positive bacilli. Diphtheroids. A few larger gram positive bacilli. Many gram negative bacilli, short and thick, of medium length. Sputum 2/25/20. No acid fast bacilli. No elastic tissue. Sputum consists of a mass of pus and mucus. Blood 2/24/20—W.B.C.—20,100, 3,100,000. Hb., 71 per cent. Polys., 90 per cent; Lymphs., 10 per cent. Urine 2/25/20—S. G. 1025.

Alb., very ft. trace. No acetone, diacetic acid or indican. Many epith. and white blood cells. Sputum 2/26/20—No acid fast bacilli. Culture from lung 2/27/20—Staphylococcus albus, streptococcus viridans.

February 22, 1920. Bronchoscopy by Dr. H. L. Lynah, Dr. Voorhees assisting. Cocaine anesthesia. Patient very nervous and apprehensive. A 7 mm. bronchoscope was passed into the right main bronchus and much pus was seen coming out. The right upper lobe branch was examined and was found to be very edematous and almost completely closed. At each cough there was a trickle of pus out of the mouth of the swollen bronchus. The long slanting lip of the bronchoscope was insinuated gently into the mouth of the upper lobe branch and a sloughing mass was removed. No foreign body was found. Suction and removal of considerable pus, which was drawn into a sterile bottle for laboratory examination. As above noted, the pus showed a long chain streptococcus, short rods and pneumococci. Only the right upper lobe seemed to be emitting pus, none of the other lobe branches were involved. Time of bronchoscopy, 15 minutes. Patient to bed. No reaction. Patient felt better. Later on the patient was unable to evacuate pus and postural drainage availed nothing. X-ray plates made at this time led us to believe that the abscess had ruptured into the pleura. Foul odor, but no pus. Dr. Nathan Green was consulted about thoracotomy, but he advised against it. The patient became profoundly septic and died three days after leaving the hospital. No necropsy was permitted.

During recent months there has been considerable discussion in the medical press regarding the cause of lung abscess. One of the protagonists declares against the use of the suction-pressure apparatus. He assumes that particles of infectious material are blown into the lungs through the pressure administration of ether. That is, I believe, a false assumption, as the pressure is entirely insufficient to blow clots of blood out of the air path. There is, however, a very great suction effort on the part of the lungs to pull in the air against spasm of the glottis, falling back of the tongue or blood clots, etc., which may lodge at the laryngeal introitus. Any observer who will take the trouble to keep a hand on the patient's chest during the operation will at times feel this negative pressure effort.

As to the offending particles which are inspired, they are either blood clots, pieces of adenoid, so-called "cheesy" masses from the tonsil, a broken tooth, or rarely pieces of tonsil which have broken off from the main mass in the removal. In my work the assistant

on the suction and the anesthetist are trained to watch the teeth and any possible detached adenoid tissue. While operating on children we have many times captured an extruded tooth and removed it before it could lodge in the airways or esophagus. There is no doubt that we all should be more careful to watch for fragments of adenoid. Suction is in this instance of direct advantage, as particles of adenoid tissue often are found clinging to the metal tube when it is withdrawn from the pharynx. Personally I use first the LaForce box-like adenotome. As this often leaves large masses behind, especially in the lateral regions of the naso-pharynx and in the Fossae of Rosenmuller, a curette of small size is used after the LaForce to sweep the field clean. It is, however, very important to turn the curette during removal, so that the index finger of the free hand can keep removed particles from falling off the blade.

As for the "cheesy" masses, one should try to remove them by pressure, curette and suction before starting the tonsillar dissection. In using the Sluder method cheesy masses are forced out of the crypts during the engaging of the tonsil in the ring of the instrument. I have a feeling that this infectious material is more responsible for post-operative trouble than any other one thing. It is just possible that the alleged increase of lung abscesses following tonsillectomy in late years is due to the fact that nearly all operators disregard these cheesy particles and go right ahead with the enucleation by evagination. It would possibly be a step in the right direction, if in teaching students, we should require them to hunt for and remove all detritus from the tonsillar crypts before beginning the operation.

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LARYNGOLOGICAL ASPECT OF INCIPIENT HYPERTHYROIDISM.*

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Diseases of the thyroid gland come within the sphere of many specialties. If it is true that foci of infection, and especially diseased tonsils, play a prominent role in the etiology of thyroidal disease, then the laryngologist should see a comparatively large number of early cases of hyperthyroidism. In the hurry of his routine work he is apt to overlook these cases.

Well marked cases of thyroid disease will not be considered in this paper. Attention will be confined to patients, who come to the clinic, complaining of catarrh or constant colds or some vague throat condition, in whom a close study reveals increased stimulation of the thyroid gland. It is of the utmost importance to recognize these patients with early signs of overactivity of this gland, because if detected early, the diseased condition yields to appropriate treatment. Our endeavor should be to prevent these incipient cases from developing into serious types of this disease.

Symptoms and Signs. As already stated, these patients come to the clinic complaining of some discomfort in the throat, and most of them characterize this discomfort as a choking sensation. Some complain of nasal discharge and of easily catching cold. On close questioning we find that they are of nervous temperament and that they have palpitation of the heart on exertion. The majority of these patients show demonstrable foci of infection in the tonsils. Foci of infection of the teeth, the nasal sinuses, the intestinal and the genito-urinary systems must not be overlooked. Most patients show a fine tremor of the tongue. This is a very typical and almost constant sign, which should direct the examiner's attention to the thyroid gland. There is usually also a fine tremor of the fingers. There may be no visible enlargement of the thyroid gland, although on close examination it appears slightly enlarged in the majority of instances. There are no eye symptoms, with the exception that some cases show a dilatation of the pupils, which in all probability is due to an increased irritability of the sympathetic nervous system. The pulse rate is increased in all cases ranging from 90 to 120.

Diagnosis. As these patients are not so severely toxic to demand basal metabolic studies, the adrenalin test in conjunction with the other symptoms are usually sufficient to make the diagnosis. This

*From the Throat Department of the Manhattan Eye, Ear and Throat Hospital.

test consists of injecting one half c.c. of adrenalin hydrochloride, 1-1000 solution, intramuscularly into the arm. In cases of hyperthyroidism a positive reaction is obtained. In a few minutes after the injection there is an exaggeration of the symptoms present and latent symptoms of hyperthyroidism are usually brought out. There is an increase in pulse rate from ten to thirty beats per minutes, and a rise in blood pressure from ten to thirty mm. of mercury. A positive reaction is also characterized by increased nervousness, pallor of the face, an increase of the fine tremor of the fingers and the tongue, and sometimes a dilatation of the pupils.

This reaction can be explained as follows: It has been experimentally shown that the thyroid secretion sensitises the sympathetic nervous system to the action of adrenalin. If adrenalin is injected as is done in this test, the sudden increase of adrenalin in the blood overstimulates the sympathetic nervous system. Thus we can explain the increased heart action by the stimulating effect of adrenalin on the sympathetic nervous mechanism of the heart, the pallor of the face by the effect of adrenalin on the vasoconstrictor fibers of the face and the dilatation of the pupils by the action of adrenalin on the sympathetic fibers supplying the dilator pupillae muscles. The tremor and the nervousness cannot be so easily explained.

Cannon of Harward, has shown that by stimulation of the cervical sympathetic nerves, the thyroid gland could be stimulated to secretory activity. Toxins from foci of infection in all probability stimulate the adrenal glands and the sympathetic nervous system. The secretion from the adrenal glands stimulates the thyroid gland, either directly through the blood stream or indirectly by means of the cervical sympathetic nerves. Thus we see that a vicious circle is formed and it is necessary to understand this mechanism in order to be able to treat these patients intelligently. It is also possible that toxins from foci of infection stimulate the thyroid gland directly.

Treatment. One of the most essential points in the treatment of these cases is the localization and the elimination of all foci of infection by surgical or medical means. Inasmuch as these patients have a hyperirritability of the sympathetic nervous system, an agent that will depress this system would be of great value. A. Clerc and G. Pezzi (Paris letter, Feb. 7, 1920, A. M. A.), have communicated to the Academie des Sciences of Paris the results of their researches, which go to prove that, while adrenalin acts as a stimulant to the sympathetic nervous system, quinin acts as a depressant. Quinin in the form of quinin hydrobromate gr. V, three times a day, acts like a specific in the early types of hyperthyroidism. It can be taken for months without any untoward effects. It should be remembered,

however, that the first few doses may cause some annoying symptoms, like dizziness, abdominal cramps, or ringing in the ears. This should not deter the physician from continuing the use of the drug. Quinin hydrobromate seems also to have a regulating effect on the menstrual period. These patients usually have an irregular menstruation and upon taking the quinin hydrobromate the menstruation usually becomes regular. The results of the treatment are very satisfactory. Within a few weeks the pulse rate comes down to nearly normal, the nervousness diminishes and the tremor of the hands, if present, usually disappears. One of the last signs to disappear is the tremor of the tongue.

Case Reports. From among the patients studied by the writer during the past year at the Manhattan Eye, Ear and Throat Hospital, clinic of Dr. McCullagh, a few illustrative cases will be briefly reported.

Case No. 86001. E. D., age 34, female, single, came to the hospital Dec. 18, 1920, complaining of soreness in the throat, and choking sensations whenever she has a cold. Patient was very nervous and had palpitation of the heart on exertion. There was a fine tremor of the tongue, but no tremor of the hands. Pulse was 110. Tonsils showed evidence of disease, but were not acutely inflamed. Heart, negative. Thyroid gland was very slightly enlarged. Adrenalin reaction was strongly positive. Quinn hydrobromate, gr. V, three times a day, has caused a great improvement in all symptoms. Patient feels so well that she hesitates to have her tonsils removed.

Case No. 72774. M. O., female, 18 years old, came to the hospital Sept. 20, 1920. Chief complaint was a choking sensation in the throat and a profuse nasal discharge. The patient also had palpitation of the heart on exertion and was very nervous. There was a fine tremor of the tongue and fingers and a pulse of 120. The tonsils showed marked evidence of disease. Heart was negative. Thyroid gland was very slightly enlarged but not visible. Adrenalin test was positive. On December 2nd, a tonsillectomy was performed under ether anesthesia. Following the tonsillectomy, the patient felt much better, the pulse was reduced to 100. Quinin hydrobromate gr. V, three times a day, was then given. Condition was much improved.

Case No. 83597. A. U., 18 years of age, female, came to the hospital December 4, 1920, complaining of a choking sensation in the throat. Throat felt sore for the last 6 years and during bad weather she always felt worse. There was palpitation of the heart on exertion and a typical tremor of the tongue and hands. Pulse 120.

There was a dilatation of the pupils. Tonsils were diseased. Heart was negative. Thyroid gland was very slightly enlarged, but not visible. Adrenalin test was strongly positive. Quinin hydrobromate, gr. V, three time a day was given. In two months' treatment the choking sensation was gone. Pulse was reduced to 82. Tremor of hands was gone. General condition was much improved. Patient continues to take the quinin. The tonsils were enucleated.

Case No. 83531. F. F., 18 years, female, came to the hospital December 4, 1920, complaining of hoarseness for one and one-half years and post nasal discharge for a long time. Had a choking sensation in the throat a few days ago. Pulse 92. Fine tremor of tongue and hands. There was no visible enlargement of the thyroid gland, although the gland could be palpated and appeared slightly enlarged. Nasal examination showed a large amount of mucous secretion on the floor of both nasal cavities. Laryngeal examination was negative, except for the fact that the vocal chords did not meet exactly in the median line, showing an involvement of the intrinsic muscles of the larynx. X-ray examination of the nasal sinuses was practically negative. Local applications to the nose and larynx did not improve the hoarseness, but apparently made it worse. Quinin hydrobromate in gr. V capsules three times a day was then given. One week after taking the quinin the patient felt generally better, and what was most surprising to all, was, that for the first time since the last one and a half years the hoarseness was gone. The patient continues to be free from hoarseness, although the postnasal discharge is as bad as before.

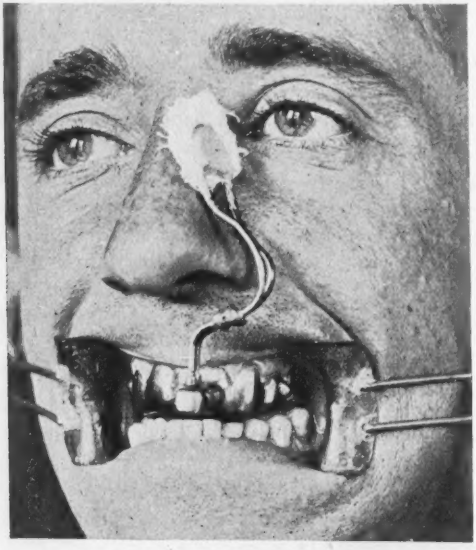
Comment. There is no doubt that these patients present an irritability of the sympathetic nervous system, *i.e.*, they are of the sympatheticotonic type. Because the basal metabolic rate has not been determined, there might be a doubt in some minds whether these patients really are early forms of hyperthyroidism. However, the tremor produced by the injection of adrenalin in these patients is so typical of the tremor of toxic goitre (very fine tremor), whereas the tremor produced by adrenalin in sympatheticotonic individuals without hperthyroidism is usually of a different character. It is less fine and more coarse. There are some who assert that hyperthyroidism is associated with a vagotonia. Vagatonia, however, does not appear in the early cases. It is in all probability due to the hyperactivity of the thyroid gland which activates all tissues of the body, including the vagus. Therefore, symptoms of vagatonia, like diarrhea, hunger contractions of the stomach, etc., do not appear except later in the disease or in the fulminating types of hyperthyroidism.

161 East 79th Street.

THE REDUCTION OF OLD FRACTURES OF THE NOSE.

Dr. Jay D. Whitham, New York.

The reduction of the deformity resulting from old fractures of the nose has been attempted by the writer in several cases. The method used was the external method described by Marshall, with certain modifications which were worked out while I was in charge of the Maxilla-facial service at the Walter Reed U. S. Army General Hospital at Washington, D. C.



This patient had an old fracture of both nasal bones with marked deflection of nose to left. Small incisions were made on each side of nose and bones refractured with a chisel. Photograph illustrates a very satisfactory appliance which was used during the process of healing to prevent recurrence of deformity. The result was excellent.

The operation is performed under light ether anesthesia. An incision three-eighths of an inch in length is made in an oblique direction, just below the junction of the nasal bone with the nasal process of the superior maxilla on each side. The incisions extend through the soft tissues and the periosteum; a small straight chisel is then used to cut through the nasal process of the superior maxilla on

each side. This must be done very carefully to avoid cutting through the mucous membrane and entering the nasal cavity.

The nose is then grasped at the bridge and pushed forcibly to the right and left until it is felt certain that the attachment of the nasal bone to the frontal bone and to the superior maxilla have been separated and that the nose is freely movable. If it is not possible to accomplish this by use of the thumb and fingers, a small pad is placed at the side of the bridge of the nose and this is tapped with a hammer. The incisions are sutured each with a single stitch of horse-hair.

In some cases, no external splint is required, but in most cases the pull of the soft tissues, the springiness remaining in the cartilage and the bony nasal septum give the nose an inclination in the direction of the original deformity. To correct this tendency is the keynote of success, and it was to accomplish this that the writer devised the nasal splint which is pictured.

The apparatus, which can be made in a few hours by a dental mechanic, consists of an upper encapping dental splint of silver with a horizontal bar projecting forward from the incisor region, to which is attached a vertical wire doubled on itself, and so arranged that by bending the bar, the degree of pressure exerted against the nose can be regulated. A small ring pad of felt is placed under the wire loop to prevent undue pressure against the nose.

The splint is cemented to the upper teeth. It should be worn for about seven days, when it will be found that the nose will remain in its new position.

The splint is more comfortable to the patient than any form of head band or skull cap, and unlike any other nasal splint known to the writer, is immovable and never out of adjustment. The results are correspondingly better and more certain.

The external incisions when healed are almost invisible.

570 Park Avenue.

THE NEED FOR MORE THOROUGH TRAINING IN OTOLOGY FOR UNDERGRADUATES IN MEDICINE.

DR. HORACE NEWHART, Minneapolis.

Medical education up to the present time has largely failed to qualify the general practitioner to properly apply the elementary facts of otology in his daily work. This rather arbitrary statement is made with a full appreciation of the splendid facilities for teaching the subject possessed by not a few of our class A medical schools, and with all respect to the many skilled specialists who are giving generously of their time and enthusiasm to the teaching of this, from a didactic point of view, difficult branch of medicine. That this assertion is justifiable and that it is of vital interest to every one whose special field of practice includes diseases of the ear is obvious when one considers the status of otology in America today.

The Association of American Medical Colleges in its prescribed curriculum of a minimum of 3600 hours for the four years' course has allotted one and one-half per cent of the total time to the combined subjects of otology, rhinology and laryngology. Since the approximate average total number of hours is 4500 instead of 3600, the minimum required time allotted to these three subjects is sixty-seven hours. An equal amount of time is apportioned to opthalmology alone, probably because this was originally the first of the surgical specialties, and its teaching needs are better understood. No one would presume to suggest, in view of the importance of the subject, that this is too much time. The fact is mentioned only for the sake of comparison.

Assuming that this period of sixty-seven hours provided for otolaryngology is equally divided, in a generous spirit of fairness, between otology on the one hand and rhino-laryngology on the other, which is actually the case in a number of our schools, we have available for instruction in otology, both didactic and clinical, the significantly small total of thirty-three hours! The absolute insufficiency of this limited time for the teaching of even the rudiments of so important a subject suggests forcibly the probability that those who first made the suggested allotment of time overlooked certain facts well known to clinical instructors of the present generation. These facts may be mentioned: That diseases of the ear, nose and throat are among the commonest maladies with which the general practitioner has to deal, especially in the young and their early

diagnosis and treatment by the family physician demand a certain amount of specialized technic and skill in instrumentation which is to be acquired only by the same sort of clinical experience which is abundantly provided for him in other departments of applied medicine. That very many cases of impaired hearing observed in adult years are due to inflammatory ear diseases occurring in infancy and early childhood. The most frequent cause of septic meningitis is the neglected or unrecognized suppuration in the middle ear or accessory nasal sinuses. In the teaching of otology we are dealing with an organ which is difficult of access and demands time-consuming procedures for its proper examination and demonstration, and whose pathology we can often demonstrate to only one student at a time. For accurate diagnosis and for controlling the results of treatment frequent functional tests are required, to be done in detail many times by the student before he attains proficiency. From these and from other facts, it becomes clearly evident that an adequate amount of time and an ample staff of inspiring teachers must be provided, if we would properly prepare the undergraduate in this branch.

An examination of the recent departmental announcements of more than fifty class A medical schools shows a wide discrepancy in the amount of required work in otology, which varies from a total of but twelve hours of lectures in one of our great metropolitan schools (the clinical hours being entirely optional), to eighty-six hours of required otology in a school whose late lamented dean was himself an otologist of note. In only seventeen schools do we find that this subject is given such prominence that it is considered worthy of being taught as a separate clinical unit. Nine colleges still adhere to the traditional system of combining instruction in diseases of the eye, ear and nose in one clinic, a method which may have been justified only in the earliest days in the evolution of these surgical specialties. In twenty-nine schools it is still found expedient to combine the clinical work in otology with that in rhino-laryngology, a system possessing both its advantages as well as its disadvantages, the latter coming through an inability of both student and teacher to do intensive work on but a single subject. In twenty-seven colleges the combined teaching of otology and rhino-laryngology is allowed less time than is given up to ophthalmology.

While in many institutions it must be granted that the subject of otology is ideally covered, in the majority of our schools there is yet much to be accomplished. It is worthy of note that in three schools in which otology is conspicuous because it is not slighted, the dean has been a teacher of this subject.

Largely in consequence of the insufficiency of his knowledge of ear diseases, the general practitioner, as soon as he finds compensatory work in other lines, usually acquires or assumes an indifference towards ear diseases, which is highly detrimental to the best interests of the medical profession and to the public alike. This indifference is partly accounted for by his frequent failure to attain any noteworthy success in dealing with chronic cases, of whom the vast majority, ignorant of the advantages of early diagnosis and treatment, seek relief only from their most noticeable or painful symptoms when it is too late to give them appreciable help.

The one great outstanding task of modern otology is the conservation of the integrity of the ear as a special sense organ and the prevention of death through its involvement in suppurative disease. How very inadequate have been our attainments in the meeting of this problem is convincingly shown by the wide prevalence of neglected ear diseases at the present time. It is conservatively estimated that there are in the United States no less than 3,000,000 individuals with hearing so impaired as to be a noticeable handicap in their social intercourse and in their economic efficiency. Medical inspection in our public schools has disclosed the fact that from two to six per cent of children of school age have discharging ears. How many needless deaths occur annually in our own country from neglected middle ear suppuration, we have no means of determining, but the undisputed statement of Prof. Koerner that four per cent of all deaths registered in Prussia among persons under the age of thirty years result from ear diseases is most significant. The admission that the majority of all ear diseases are preventable by the timely application of knowledge and skill which should be possessed by every man assuming the responsibilities of a general practice, is incriminating evidence of our inefficiency and a most convincing argument for more thorough training in otology than is given in the average medical school.

During the last decade the additions to our specific knowledge in otology have been fully commensurate with the progress made in other branches of medical science. Not the least important advance has come through a realization of the fact that the ear can no longer be regarded as an isolated anatomical and physiological unit, to be separately dealt with, but that it is a most delicate, highly specialized organ which is very susceptible to damage from the harmful influence of toxic disturbances originating in other parts of the body, such as focal infections, systemic diseases, faulty metabolism, impaired function of the ductless glands, and cardio-vascular and renal

diseases. Thus the early recognition and successful treatment of many of the non-inflammatory ear affections, not infrequently call into play the diagnostic and therapeutic resources of internal medicine. The clinical facts already established concerning the static-kinetic labyrinth have also added another new chapter to otologic knowledge. All this demands a revision and expansion of the subject-matter of otology and necessitates a substantial increase in the number of teaching hours to be allotted to the subject.

The recent awakening of popular interest in the betterment of the race through attention to the physical needs of the individual implies that the physician carry a larger responsibility than ever before in regard to preventive medicine. To prove himself worthy of the utmost confidence of the public, he must manifest an active interest in the conservation of their special sense organs, as well as of their general health.

The benefits to accrue to the public from improved instruction in otology have already been made clear. Likewise the advantages to the general practitioner have been suggested in the broader and more effective interest in medicine which his possession of a larger knowledge of otology will yield.

It is the oto-laryngologist himself, however, who is chiefly concerned in a more thorough training of the undergraduate in the fundamental principles of our subject. To him will result the greatest individual benefit, for he will receive more fully than in the past that which he has especially lacked to place his work upon a satisfactory basis, namely: the support and co-operation of the family physician. When the latter is better trained, he will have a fuller appreciation of the specialist's problems, and will be ready to help educate the public to the absolute necessity of early prophylactic and therapeutic care in the successful combating of ear disorders. He will be constantly on the alert to detect all possible factors which may produce ear disorders in his patients and will be quick to suggest or provide the remedy.

That the general practitioner will ever seriously invade the field of the specialist is not to be feared, for the successful physician is too much occupied with other more alluring subjects to be tempted to give adequate detailed attention to his ear cases, whenever there is a qualified specialist accessible. But in communities in which there is not a man possessing specialized training in this field, the duty of the general physician is obvious.

Instruction in otology for undergraduate students, in order to meet both the real needs of the situation, should be standardized.

The matter of standardization is a proper subject for a committee constituted similarly to the committees who have already accomplished much to raise the standards of post-graduate work in ophthalmology and oto-laryngology.

The didactic and clinical teaching in otology in all of our colleges should measure up relatively in quality and quantity with instruction in other medical subjects. That this may be accomplished, there must be provided in the majority of our schools a material addition to the number of teaching hours now allotted to this subject.

A study of the departmental announcements of our class A schools, and frequent inquiry among students and graduates of various colleges as to how far the instruction they had received had met their needs, together with an experience in attempting to teach otology under the adverse conditions imposed by an overcrowded curriculum and a numerically inadequate staff prompt the following conclusions:

A minimum of from twenty to twenty-four hours should be allowed for didactic lectures covering the fundamental elements of otology in order to meet even the moderate requirements of the general practitioner. This should include a presentation of the accepted facts of neuro-otology insofar as they may be of service to him in his regular work. In schools in which there is no separate department for defects of speech, at least one hour of the didactic work should be given to this closely allied subject, which is practically ignored in all but a few American schools.

Clinical instruction, chiefly in small sections, with an ample number of interest-inspiring teachers to supervise the work of each student, should be provided for a period of at least twenty to twenty-four hours. It has been proven, at least to the writer's satisfaction, that any shorter period of instruction does not permit the average student to acquire enough proficiency to enable him to creditably carry on the practical work in otology which may be delegated to the man in general practice.

No argument is necessary to demonstrate the importance of having the didactic and clinical work in rhinology and laryngology precede instruction in otology and that the didactic instruction in otology precede the clinical work. A failure to thus co-ordinate the work exists in too many schools.

Elective courses in otology for undergraduate students are undesirable as tending to promote too early specialization. The subject-matter of such courses should rather be embodied in courses for post-graduate students who are intensively preparing themselves for the work of the specialist.

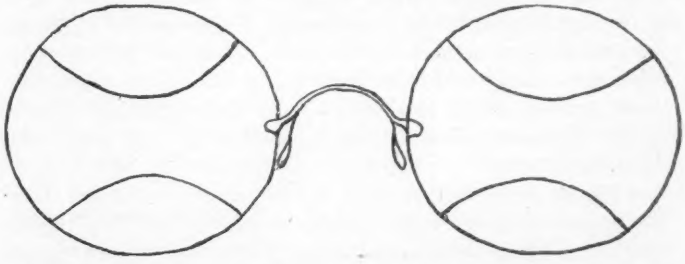
The spending of many hours in watching the details of operations on the mastoid, or procedures for the relief of endocranial complications, which, as a general practitioner, he should never be encouraged to perform, is largely a waste of the student's time in view of his need for attaining the greatest possible proficiency in the less spectacular procedures as history taking, direct otoscopic examinations, functional testing and treatment of the commoner ear complaints.

The aim of all undergraduate instruction in otology should be to make the general practitioner a safe and dependable man in the doing of such work as properly lies within the limitation of his sphere, and is emphatically not to graduate him a premature specialist.

Donaldson Building.

COMMUNICATION.

Having reached the age of forty-seven and requiring a distant glass at all times and reading glass for close work, I have been greatly annoyed in my office work where a constant change of glasses was necessary when using the head-mirror. I finally tried a magnifying segment above, as well as below, and by tilting the head slightly and placing the opening of the head mirror opposite, the



upper segment, have no difficulty in treating patients and use the glasses entire throughout the day without changing for office work.

It occurred to me that there might be other nose men in my predicament and I am therefore reporting the satisfactory solution of this problem.

The segment, of course, can be made larger or smaller, according to the idea of the individual using them.

DR. P. M. FARRINGTON.

THE USE OF SCARLET RED EMULSION IN ATROPHIC RHINITIS (OZENA)—(A PRELIMINARY REPORT.)

Dr. J. Coleman Scal, New York City.

Atrophic rhinitis, despite the use of all known remedies, has always been refractory towards treatment. While experimenting with one thing and another, scarlet red emulsion was brought to the attention of the writer and was given a trial.

In order to present these experiments with greater clarity, the anatomy, pathology and physiology of the nose must be reviewed briefly. Anatomically, the nose consists of two parts: first, the outer or lower part, which is the part concerned in respiration and consists mostly of cartilage supported by bone only; and second, the upper or nasal cavity proper, which is in the skull and which supports the membrane containing the nerves of smell. The roof of the upper or bony part is formed behind by the sphenoid and in front by the ethmoid, the cribriform plate of which acts like a sieve for the nerves supplying the sensory organs in the olfactory mucous membrane. The outer wall is formed by the ethmoid, superior maxilla, palate and sphenoid, and to these are attached the turbinate bones. The turbinates, three in number, consist of a thin bony frame covered by vascular mucous membrane possessing erectile tissue. These divide the nasal cavity into three meatuses into which the various sinuses open. The nasal septum, which divides the nasal cavities, is composed of the triangular cartilage and the perpendicular plate of the ethmoid and the vomer.

The pathological changes are limited to the mucous membrane and constitute a true fibrosis. Eventually bone involvement occurs, connective tissue overgrowth takes place, followed by contraction, which involves the blood vessels, as well as the glandular element producing the well-known functional disturbances. In these cases an examination of the nose reveals the characteristic fetid odor, the nasal fossae being clogged with masses of inspissated secretions. The mucous membrane is pale, thinned and dry. The celiated epitheleum are displaced by squamous cells. The turbinates are atrophied making wide spaces and roominess in the nasal cavity, so that the posterior pharyngeal wall is seen quite readily. The secretion varies as the muco-purulent discharge dries and becomes adherent to the mucous membrane in the form of crusts. The sense of smell is dulled and in advanced cases is entirely lost, so that the patient himself does not notice the odor.

*(From the Oto-Laryngological Dept., Service of Dr. S. J. Kopetsky, Beth Israel Hospital.)

The etiology in this condition is not settled. Various theories and causes have been given, among which are first: that it is due to a bacillus which has been described by Abel, Horn and Perez. Lermoyez reports that the bacillus of Perez is the active causative agent in that it is able to develop the characteristic odor and is able to produce this disease in animals by inoculation. The bacillus resembles the diphtheria bacillus to such an extent that many authorities have tried to cure this condition with diphtheria antitoxin and have reported good results. Another factor is a faulty nasal development which causes a decreased blood supply and interstitial pressure which obliterate the blood vessels and at the same time interfere with the nerve supply and glandular functions. Others state that it is a condition consequent upon diseases of the accessory sinuses predisposed by presence of spurs and deviated septa or the end result of a purulent rhinitis.

In the old methods of treatment daily douches of the nose with alkaline solutions and injections of vaccines (Abel's) were advised. H. A. Schatz, in January, 1919, THE LARYNGOSCOPE, reports marked improvement in most of his ozena cases with a polyvalent vaccine derived from cultures made from these cases. Wittmark and Iglauer described an ingenious method of forming an oro-nasal fistula which was reported by Professor Meyer at Vienna in the *Lancet*, April 3rd, 1920. The principle was to eliminate the crusts and odor by producing a constant washing of the nose. This was done by implanting the parotid duct into the nasal cavity, thus causing the saliva to keep the mucous membrane moist by establishing a continuous irrigation of the nasal fossae. Some patients, after undergoing this operation, were inconvenienced to such an extent by the saliva running through the nose at every meal that they decided the ozena was the perferable complaint. Other treatment consisted in attempted restoration of the turbinates by means of submucous injections of paraffin, which were used extensively by Lake and Brindell. Stiel used a 5 to 10 per cent solution of dionin (ethyl morphin) with the purpose of causing a swelling of the turbinates and reports good results. Electric treatment, radiotherapy, packing the nasal fossae (Gottstein) and injections of lactic acid bacilli (North and Curtis) were all without results.

The treatment of this condition with scarlet red was described first in 1913 by Joseph Jacobs, who tried to apply the qualities of scarlet red, but failed in that he could not get a proper emulsion. Such a preparation, having quince seed as its base, is now available. It is found to adhere closely to the mucous membranes in spite of

the secretion. The water soluble scarlet red (Biebrich azo-benzine) is used. Its action is based on its antiseptic quality as a dye preventing bacterial growth, thereby removing the fetid odor and by restoring the glandular functions by stimulating cell proliferation.

The method used in applying the scarlet red emulsion is simple. First, have the patient douche or spray his nose with Dobell's or any other alkaline solution, then apply a 4 per cent scarlet red emulsion to all parts of the nasal mucous membrane and the same time massage it gently with the applicator. This will form a thick film of the emulsion. Applications should be renewed every forty-eight hours. Pronounced results must not be expected immediately, but the odor and scabs may be absent after the second application.

In conclusion, many atrophic rhinitis cases terminate spontaneously, the symptoms disappearing entirely. This tends to uphold the contention that this condition is due to bacterial origin. An acquired immunity may result, causing the disease to disappear and leaving only the damage already done to the tissues. The majority of patients suffering from this condition are women; in a series of fifteen cases, thirteen were women and two men. Whether or not patients will remain relieved by this treatment is as yet undetermined, as the length of time under observation does not warrant final conclusions. This report is made to stimulate others to try this method of treatment. Further report will be made.

950 Park Avenue.

AN UNUSUAL CASE OF BILATERAL ABDUCTOR LARYNGEAL PARESIS.

Dr. Gordon B. New, Rochester, Minn.

Since the work of Semon, in 1881, on the abductor muscles of the larynx, we have known of their proclivity to become affected first in lesions of the recurrent laryngeal nerve or in central lesions. I have not, however, been able to find in the literature a case in which the abductor muscles have given out under direct observation after repeated phonation, and have returned after rest to their normal function.

Hooper, and later, Donaldson, in experimental work on dogs, stimulated the recurrent laryngeal nerve with an electric current and observed the effect on the cords. Hooper obtained abduction of the

cords, but Donaldson found that this was due to a weak current; when the current was increased, the abduction gradually passed into adduction, and after a strong and constant stimulation, the abductor muscles became worn out and ceased to respond to stimuli. Semon and Horsley killed a group of dogs by an overdose of anesthetic, by puncture of the heart, or by bleeding. The larynx was immediately excised and the muscles of the larynx rapidly laid bare by dissecting off the mucous membrane. The muscles were then stimulated by an ordinary platinum electrode, the current being obtained from a Dubois-Reynold's sledge induction coil and supplied by a Daniell's cell. The results proved with remarkable constancy that the abductor muscles lose their excitability long before the adductor muscles.

Russel, in experiments on the recurrent laryngeal nerves in dogs, demonstrated that the abductor and adductor fibers are in two distinct bundles which can be isolated, and that the abductor fibers are situated on the inside of the nerve. Stimulation of these bundles separately produced, respectively, abduction or adduction, and cutting one bundle produced muscle degeneration in the muscle or muscles which it supplied. Russel traced, anatomically, the nerve fibers of each bundle to the muscle or muscles which they supplied.

A case is reported here of chronic anterior poliomyelitis with bulbar involvement, in which the abductors of the cords ceased to function entirely on one side, and functioned only partially on the other, when the patient phonated repeatedly, while the larynx was observed with the laryngeal mirror.

Case 348390. Mr. J. B. McG., aged 64, came to the Clinic, February 3, 1921. He had been quite well until four years before, when he noticed a beginning left foot drop. This gradually increased and the muscles of the left leg grew smaller. For the last few months he had noticed that his right leg was growing weaker and smaller, and that his back was growing weak; he had to use his hands to get on his feet from a sitting position. He had noticed difficulty in speaking for the last few months, and the character of his voice had changed in the last ten days.

At the time of his examination he walked with a limp and a foot drop, and used a cane. His normal weight which had been 200 pounds was now 185 pounds. His systolic blood pressure was 160; his diastolic was 90. He had some arteriosclerosis. His vision was 6/10 and 6/5; the fundus was negative. Blood and spinal fluid Wassermann reactions were negative. The neurologic examination revealed a marked atrophy of the lower extremities, with correspond-

ing loss of strength and fibrillary twitchings. In the upper extremities the corresponding loss of strength and fibrillary twitchings were moderate. The deep reflexes were diminished in both upper and lower extremities; the left tendo-Achillis reflex was absent. There were no plantar extensor phenomena, nor indication of syphilitic involvement. When the patient's larynx was first examined, both cords moved quite normally. On repeated phonation, the abductors on the right side completely gave out, and the right cord was in the position of complete abductor paralysis. On the left side the abductor gave out about one-half, and the abduction was graded 2 on a scale of 1 to 4. After the patient had rested for from five to ten minutes the cords again moved quite normally. This phenomenon was repeated a number of times and was observed by several physicians so that the change in the movement of the cords was unquestionable.

A partial or complete abductor paralysis due to involvement of the recurrent laryngeal nerve, or to central lesions, is often seen, but this is the first time that I have observed a case in which the use of the voice for a fraction of a minute tired out the abductors so that they could not function until rested. The condition of the nerve supply was responsible.

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NEW INTRA-NASAL SUTURE SET.

Dr. Sidney Israel, Houston, Texas.

Intra-nasal suture, especially in work about the septum, to date has been a vexatious ordeal necessitating many varieties of needles with ligature catchers, etc., which have added materially to the complexity of the problem.

I am convinced, following my experience in plastic surgery of the nose, that the needle holder which terminates in the needle as a part of the shaft of the instrument is fundamentally wrong from a surgical standpoint.

Through force of necessity for a simple instrument to facilitate rapid suture about the nasal septum, the following intra-nasal suture set has been devised.

The set consists of three handles, each terminating in a slot-like shoulder, at the end of each shaft. The shoulder being set in three positions, namely:

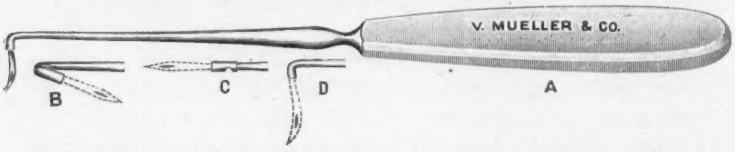
1. Vertical or straight;
2. Right angles, and
3. Acute, or at an angle of 45 degrees.

The needles are one-half inch in length, tapering into a point at one end in which is located the eye. The other end is blunt tipped, so as to fit snugly into the slotted shoulder of the needle holder. The needle is inserted into the slotted shoulder of the needle holder, and the eye threaded with whatever suture material selected.

The instrument is then inserted into one or the other of the nostrils, and in a case of suture about the septum, the needle is made to penetrate through the entire septum. With any form of grasping forcep, the needle containing the suture is caught and pulled through the septum to the opposite side and out of the nostril. The needle holder, having been withdrawn, the needle is re-inserted into the needle holder and passed back through the septum from the opposite side, leaving both ends of the suture on the same side of the septum or extending through the right or left nostril, as the case may be. The ends are then tied, and the knot tightened with any form of knot tightener at present on the market. An appendix tucker, such as is used for the inversion of the appendix stump by the general surgeon, serves admirably for this purpose.

By means of the technique just described, one is able to do practically a continuous suture of the septum by the re-insertion and withdrawal of the needle containing the suture material through the septum from one side to the other.

The shaft of the needle holder is made thin, but of highly tempered steel, so as to avoid as little bend or spring as possible.



The needle holders, three in number, with the notched shoulder coming off at various angles, is made so as to fulfill any suture requirements that might be necessary in various positions.

The needles are also made curved and straight.

Since using this intra-nasal suture set, the work for which it was devised has been greatly facilitated.

Carter Building.

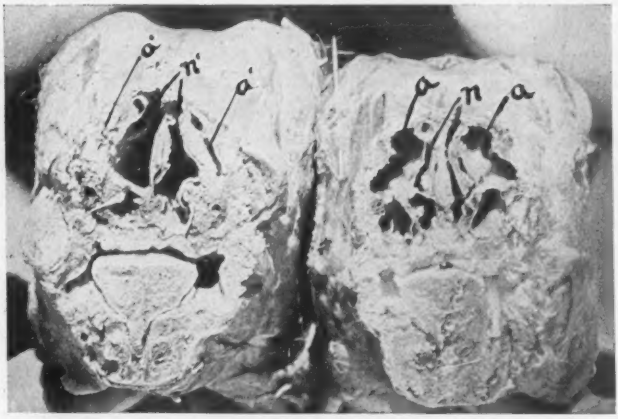
DEFORMITY OF THE NASAL BONES FOLLOWING CHRONIC NASAL SUPPURATION IN A RABBIT.

Dr. William V. Mullin and Dr. Charles T. Ryder,
Colorado Springs, Colo.

During the past year we have made several attempts, with the help of Dr. William F. Drea of Colorado Springs, to demonstrate lymphatic absorption from the antrum, stage by stage, in a series of radiographs. We have not had much success with this, as we have not found a substance easily absorbed, like India ink, and at the same time capable of casting a shadow, but one incidental observation in the course of the experiments seems worth recording.

Rabbit A was injected in the right antrum, first with iodin in an attempt to produce inflammatory obstruction of the foramen, then with a heavy suspension of barium sulphate. Radiographic plates

showed a normal nasal structure at the beginning of the experiment. The injection mass escaped gradually through the foramen into the nose. After the injection, and repeated etherizations for the purpose of taking plates, the rabbit developed a severe chronic nasal suppuration with evidence of obstruction. When he was killed about three months later, and a transverse section made of the head,



we were surprised to find very great deformity of the nasal bones. The antra, normally very large, were almost obliterated by lateral bowing of their inner walls, and the nasal fossae were correspondingly dilated. Apparently this change had resulted from the pressure of a profuse obstructive suppuration. We report this for its possible bearing upon the role of chronic suppuration in the etiology of septum deviation.

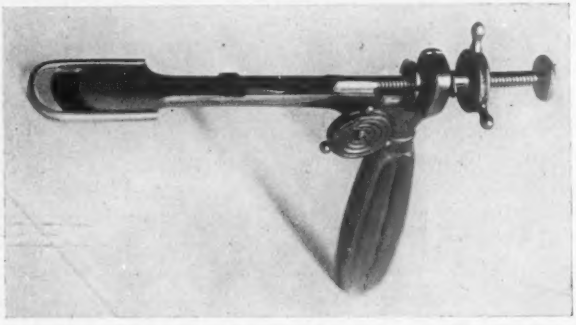
A CONTRIBUTION TO THE SURGERY OF THE TONSILS—THE HEMOSTATIC TONSILLECTOME.

DR. C. G. CRANE, Brooklyn, N. Y.

Since the acceptance of complete removal of the tonsils as the only procedure permissible, there have been a great many methods advocated for the accomplishment of what should be a comparatively simple surgical procedure. All the early procedures were variations in the technic of dissection and the use of the snare. The advocates of blunt dissection, followed by the snare, had their day. Various forms of scissors and blunt dissectors were devised. The "quick snare" was soon displaced by the "slow snare." The blunt dissector was discarded by many operators for dissection with the sharp knife. The advocates of the sharp knife were on safe ground in stating that its use entailed the least traumatism. It is very evident that the objective to be obtained is a surgical technic which will completely remove the tonsils with the least traumatism, the least hemorrhage during or following the operation and with sufficient speed to permit of a short anesthesia.

With the advent of the Sluder technic, we were again deluged with many modifications in the instrument to be employed. The Sluder technic found ready acceptance and was soon the popular operation. The Sluder operation was heralded as a speedy method to be indulged in by anyone regardless of skill or previous surgical training. Many incomplete operations and many damaged throats ensued. As a result this operation came in for considerable criticism. That the Sluder procedure has survived the ordeal of reckless and unskilled use speaks much for its basic qualifications. The hemorrhage attendant on the Sluder operation, even when skillfully performed, is undoubtedly far in excess of that attendant on an equally well-performed sharp dissection and slow snare operation. It cannot be said that the likelihood of secondary hemorrhage is greater with one than with the other. A comparison of the end results following these two methods certainly favors the Sluder technic. There is less scar tissue and less likelihood of contraction of the pillars and soft palate following the Sluder than there is following the sharp dissection and slow snare method. In making this statement we must bear in mind that such a conclusion can be arrived at only by the comparison of cases presenting the same surgical aspects and operated with equal skill.

The writer has long been an advocate of the sharp dissection and the slow snare technic, and he still feels that this operation will always have its place in the surgery of the tonsils. It will always be wise to teach the prospective specialist the proper technic of such a procedure. Having had considerable experience with the Sluder method, I have concluded that such a technic would be the ideal operation where it possible to carry it out with little or no bleeding and without the necessity of tearing out the pedicle. While it is true that we frequently perform the Sluder operation in this ideal manner with the instruments in use at the present time, it is very evident that this is the excepion. The elimination of undue bleeding at the time of operation certainly lessens the seriousness of loss of blood if bleeding should occur subsequently. Complete recovery from the operation is hastened by a minimum of traumatism, hemorrhage and anesthesia. A number of instruments have been devised



to accomplish this end. Experience in the use of these instruments has demonstrated that up to the present time no single instrument possesses all the requirements needed for the perfect operation. The hope of perfecting such an instrument is my apology for adding to the already voluminous literature on this subject. It is with a great deal of hesitation that the instrument about to be described is presented to the profession for their consideration and I hope acceptance.

The technic to be employed in the use of this instrument is in all respects that which is known as the Sluder operation. The principle of the dull and sharp blade is not new, there being at least two instruments on the market employing the dull and sharp blades. It is believed that this instrument has overcome the mechanical faults of those at present available. The general construction and size is

such as to make it a generally useful instrument. It is strongly built, readily taken apart for purposes of cleaning, and has no parts that will readily get out of order, even with the use and care given such instruments in hospital practice. The dull blade or hemostat is sufficiently broad-edged to act as an efficient hemostat. This blade is convex and fits perfectly into the concavity of the ring. With the tonsil completely through the ring the hemostatic blade is slowly pushed forward and held with the thumb, while the friction clutch screw is tightened with the free hand. The friction clutch screw is a new device and with it the hemostat can be driven forward with great force so as to completely crush the pedicle. This can be done as slowly as the operator may choose, as its operation is smooth as well as powerful. With the pedicle held firmly, but gently, in the grasp of the hemostat, the cutting blade is put in motion whenever the operator feels that the hemostasis has been of sufficient duration. Before using the cutting blade the tonsil is seized with some type of grasping forceps. The instrument is provided with two cutting blades. The fenestrated or ring knife cuts from behind forward. In cutting from before backward the instrument is introduced into the throat with the dull and sharp blades in the same position. In cutting from behind forward, the fenestrated blade is pushed forward until concealed in the ring of the instrument, before introduction into the throat. The solid blade, however, can only be used in cutting from before backward. The gear mechanism used to drive the sharp blade in either direction works very smoothly and possesses unlimited power. Its operation is such as to enable the operator to cut off the tonsil as slowly and as gently as he may choose to do it, and without in the least disturbing the hemostat blade. This latter advantage is important if we are to secure perfect hemostasis. After the tonsil has been completely severed, the hemostat blade can be kept in place as long as the operator desires. The release of the hemostat blade can be, and it is very important that it should be, done very gently, so as not to disturb the crushed pedicle. With this instrument employed with due regard to the technic as described, it is believed that not only are the advantages previously mentioned readily obtainable, but in addition, we are reducing to a minimum the prospects of post-operative complications and sequelae, some of which are indeed decidedly serious.

121 St. James Place.

GEORGE MOREWOOD LEFFERTS, A.M., M.D., M.S.

The passing of George Morewood Lefferts of New York, marks the close of an important era in the history of laryngology. Beginning his career almost at the outset of the recognition of laryngology as a specialty in the United States, he lived to see it fully established as one of the great departments of modern medicine. In its development and progress his many and varied contributions furnished by no means an unimportant part.

Dr. Lefferts was born in Brooklyn, N. Y., in 1846. His father, Marshall Lefferts, was descended from the best stock of the early Dutch settlers of Manhattan. By profession an electrical engineer, he invented improvements in telegraphy. A man of strong character and remarkable physical perfection, he distinguished himself during the Civil War as colonel of the Seventh Regiment of the National Guard of the State of New York, then considered the finest body of its kind in the country. His mother, Mary Allen, daughter of Gilbert Allen, an old-time merchant of New York, who was descended from the best and purest of the original New England Colonists of Mayflower fame.

Dr. Lefferts was educated in the public schools of New York City and was graduated in the arts from the College of New York City of New York in 1867, and in medicine from the College of Physicians and Surgeons in 1870. Upon graduating, he filled a short interneship in Bellevue Hospital, and one of eighteen months at St. Luke's Hospital, both of New York City. He then spent two years of diligent work at the laryngological clinics of London and Paris, and at Vienna, where he attended the clinic of Prof. Schroetter, and later that of Prof. Karl Stoerk of the Imperial University, who soon appointed him as his chief of clinic. Young Lefferts was the first American student to be so honored.

While the intensive study of the physiology and pathology of the upper air passages had been carried on for nearly a generation before Dr. Lefferts' time, beginning with the epoch-making discoveries of Horace Green of New York, the well named "father of laryngology," who demonstrated the hitherto unknown tolerance of the

larynx to the introduction of a foreign body and with Gurdon Buck of New York, the father of intra-laryngeal surgery. The science of laryngology as we now know it, though the invention of the laryngoscope was in its infancy. In 1872, J. Silas Cohen had just published his system of laryngology, the most comprehensive of its kind that had yet appeared. Dr. Lefferts began the practice of his specialty in New York City in 1873, in company with a group of contemporaries many of whom had, like himself, recently returned from abroad after having been thoroughly trained under the instruction of the best foreign masters. Among these were Clinton Wagner, Beverley Robinson, Morris Asch and several who later attained distinction in other departments.

Upon his return to New York in 1873, he was at once appointed instructor in laryngology in the College of Physicians and Surgeons, New York City, and in 1875, professor. This position he held for thirty years, resigning in 1904. Dr. Lefferts regarded his professorship as the highest honor and greatest opportunity of his life. To its interests he devoted his best energies, unsparing of time, labor or financial outlay. Year after year his lectures were revised with scrupulous care, new illustrative material added wherever possible to his splendid collection of charts, models, specimens, apparatus, etc., and improved arrangements made for the securing and demonstration to each member of the class of the best clinical material bearing upon the subject in hand. As a lecturer, he was clear, emphatic, persuasive, never failing to hold the interest of his hearers, and to send them away, having understood and mastered what he intended them to know. His practical demonstrations of illustrative pathological conditions were most impressive. Such a course of instruction in laryngology for undergraduates as his has never been equaled. It was the result of unremitting labor by one peculiarly endowed, covering the period of a generation, of its kind a perfect thing, a model for the whole system of clinical instruction in general and as such alone well worthy of respect and preservation. In 1873, there was no society of laryngologists in any city in the world. In October of that year the New York Laryngological Society was founded by Dr. Clinton Wagner. Dr. Lefferts was one of the charter members. In 1885, it became the section in laryngology of the New York Academy of Medicine. In 1879, Dr. Lefferts was one

of the founders of the American Laryngological Association and later its fourth president. As its first secretary he was largely instrumental in its successful organization and in establishing for it those high ethical and scientific standards under which it has flourished pre-eminent for more than forty years.

In the field of Clinical Medicine his career was conspicuous. His extensive private practice embraced a clientele of the first order of influence and importance. Prompt, energetic, efficient, a specialist skilled in every department of his art, his personality, combined with the interest invariably manifested toward his patients, caused his practice and his clinics to grow rapidly in numbers and in fame.

In the palmy days of the Demilt Dispensary, he was its senior laryngologist for six years. He was the leading member and largely the organizer of the Throat Department of the New York Eye and Ear Infirmary, receiving his appointment in 1874 and holding it until 1891. He was consultant to the Outdoor Department of Bellevue Hospital, and to St. Luke's Hospital from 1877 to 1901. These appointments, together with his large clinic at the College of Physicians and Surgeons, were filled by him with the utmost zeal. The amount of material from his own clinics and those of his numerous assistants available for his own observation and for use in the illustration of his lectures was enormous.

Distinguished in the literature of laryngology, Dr. Lefferts' original theses, forceful, clear and terse, covered a variety of special subjects and were valuable scientific contributions.

In the editorial department he was again a leader. In 1880, there was no journal of laryngology in this country. Dr. Lefferts, in association with Drs. J. Solis, Cohen, Frederick I. Knight and Louis Elsberg, founded a quarterly magazine named "The Archives of Laryngology," a journal of the highest order, the best in form and in excellence of material that had ever appeared, containing as it did, original articles, editorials, book reviews, current bibliography and abstracts and matters in general pertaining to the specialty. Dr. Lefferts was collaborator of the *Archives de Laryngologie* of Paris, and from 1884 to 1910, an active collaborator of the *"Internationales Centralblatt für Laryngologie,"* of Berlin. He was associated with several other foreign special journals. His name also appears as contributor to various systems of medicine and surgery.

In the classic work of Sir Morell Mackenzie, published in 1884, there was given an invaluable bibliography, dating from the earliest times. In May, 1875, in the *New York Medical Journal,* Dr. Lefferts initiated the publication of a current laryngological bibliography accompanied by carefully prepared abstracts. In this department he was apparently the first. In 1880, these abstracts were transferred from the "Journal" to the "Archives of Laryngology." When the "Archives" went out of existence, the bibliography was taken over by the *"Index Medicus"* and the abstracts were continued in the *Centralblatt.* Thus, with the work of Morell Mackenzie, the records of Lefferts, the *Index Medicus* and the continuation of Lefferts' work in the *Centralblatt* and now in THE LARYNGOSCOPE and other periodicals, the bibliography of Laryngology is remarkably complete to date. Here again Dr. Lefferts was a pioneer.

Dr. Lefferts was a member of the leading medical societies in this country and of other laryngological societies of London, Vienna and Berlin. Possessed of elegant and refined tastes, he strove for perfection in all that he undertook. His temperament was artistic, his judgment of the beautiful was excellent. Fond of travel, he spent many summers abroad, one of them in Japan, where he secured the splendid collection of antique armor now one of the chief treasures of the Metropolitan Museum of Arts. That he succeeded brilliantly was due to no mere chance of fortune or of meritricious favor. The grace and talent that were his by fine inheritance he fully recognized and, recognizing, used and cultivated with untiring industry and zeal, devoting himself meanwhile with unwavering fixedness of purpose to the chosen object of his life. He mastered his subject by every possible means. Clinical experience, wide reading, study, writing, teaching, travel, these were the weapons with which he fought his way to undisputed eminence. Excellent in all things, he believed that his highest usefulness was attained in the realm of teaching. The key-note of his philosophy was expressed in his chosen motto, "docendo discimus"—"by teaching we learn."

Of all who have distinguished themselves in the advancement of laryngology, none has been more worthy of our gratitude or of our praise.

D. BRYSON DELAVAN, M. D.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON RHINOLOGY AND LARYNGOLOGY

January 26, 1921.

Sarcoma of the Nose: Post-Operative Condition. Dr. J. W. Babcock.

Bryan, F., age 49, a driver by occupation, was admitted to Dr. Coakley's service at Bellevue on November 20, 1920, with a history of obstruction in the left nares of three months duration. He had been kicked in the face by a horse about the time of the onset. He also complained of left frontal headache and epistaxis for three months, and had lost 20 pounds in weight during that period.

Physical examination showed moderate pallor and slight arteriosclerosis and emphysema. There was an easily bleeding dark red mass, fairly firm and covered with glairy mucus, filling the left nares, apparently attached below by a wide pedicle. It did not project into the naso-pharynx. The Wassermann and urine examinations were negative. Blood pressure 128 S. The radiograph of the sinuses showed very small maxillary sinuses and the nasal wall of the left antrum was irregular in outline and suggested invasion; cloudy left ethmoid and left antrum. Section showed vascular and herorrhagic mass, round or oval cells, with large nucleus. There were many mitotic figures, infiltrating the whole section.

Diagnosis: Malignant tumor, probably of connective tissue origin. Much pigment.

Operation, December 2, 1920, under gas and ether, revealed a friable, partially necrotic mass attached to the left lower part of the septum, floor and outer wall of the left nares and left inferior turbinate, extending from the vestibule almost to the choana. The mucosa of the ethmoid, sphenoid, and small high-placed left antrum was edematous but did not seem to be invaded, nor did the bone.

An incision was made from half way between the left inner canthus and glabella and was carried down the side of the nose, and later prolonged around the alia into the vestibule. The periosteum was reflected. the left nasal, lachrymal and nasal process, and the left superior maxilla were removed and the nares opened. The mass was then removed, together with the involved part of the septum, floor and lateral wall of the left nares. The ethmoids were exenterated, the sphenoid and left antrum were widely opened and the mucosa removed. The left nares was then packed and the wound closed by interrupted sutures. A post-nasal plug which had been inserted before the operation was removed after recovery from the anesthetic.

The wound healed by primary union, with no fever.

On December 19th, 51 mgm. of radium element was applied for an hour and a half; it was screened by ½mm. of gold and 1 mm. of rubber. This was followed by further radiation on January 4th by Dr. Wadhams.

Pathological Report—"Section from (1) nasal septum and (2) floor of nose showed invasion. (3) left antrum (4) left ethmoid, and (5) lateral wall of the nose high up showed no invasion. (6) Sections show a tumor-like mass made up of rather large ovoid and small spindle shaped cells. The tumor is very vascular and shows many mitotic figures.—J. E. McWhorter."

DISCUSSION.

Dr. Coakley said that the involvement was so great that it was impossible by any method of intra-nasal inspection to determine the extent of the lesion, and it was evident that no intra-nasal operation

offered any chance of cure. He had therefore suggested the opening up of the intra-nasal cavity by the external incision, which Dr. Babcock did, eviscerating the mass and then applying radium.

At the meeting of the American Laryngological Association in Boston, a series of cases was shown—most of them epithelioma, and two cases of sarcomata,—where this method of taking care of invasions of the sinuses, the maxillary antrum and ethmoid had been employed for three or four years with very excellent results. The difference between the methods used there and that employed in this instance was one mainly of location. Most of the cases shown there were invasions of the antrum and ethmoid, and there they left the wound open and packed it so that they could put radium in from time to time and inspect the cavity with a view of noting any indication of recurrence. Some of the cases shown were two and three years old following this method of treatment, and it was remarkable how smooth and free they were from any evidence of recurrence. All but one had a fistula in the skin, by which one could look directly into the antrum from the exterior of the face.

In the present case, the situation of the mass on the floor and septum had made him feel sure in recommending the closure of the wound and application of the radium through the nasal cavities, which would be practically as freely visible for observation as to possible recurrences as if the wound had been left open, and at the same time was much more comfortable and satisfactory for the patient.

Of course, as Dr. Babcock had said, it was still too early to decide the real value of the procedure, but if this surgical procedure together with the action of the radium should prove beneficial it would mitigate the severity of the usual procedure and redound to the greater comfort of the patient.

DR. BABCOCK said that immediately after the operation the scar was perfectly flat; now, there was a little oedema present which seemed to be due to the radium, and made the scar appear rather depressed. He would like to know the opinion of others in regard to this oedema.

Asthma Due To Maxillary Sinusitis: Relieved by Irrigation. Dr. Max Bernstein (By Invitation).

D. E., born February 3, 1910. Father and mother alive and well; a brother, 6 years old, alive and well. No history of asthma, migraine, or gout in the family.

Patient had measles at one year of age, and influenza in 1918; her tonsils and adenoids were removed in May, 1919; a tooth was extracted after X-ray examination in November, 1919.

In July, 1918, she began to have attacks of cough and shortness of breath. The attacks came on every day and at almost any time of the day or night. During this time she was subject to frequent "colds" in the head accompanied by whistling in the nose and a profuse nasal discharge. Her suffering was so intense that she was advised to seek a change of climate and accordingly, in October, 1918, she went to the Catskill Mountains and remained there six months. While in the country her attacks ceased but the nasal discharge remained just as profuse. She returned to the city on April 6, 1919, but after an interval of three days her asthmatic symptoms returned, and were of the same frequency and severity as before her sojourn in the mountains. About this time her tonsils and adenoids were removed. After a month of unrelieved suffering she was again compelled to seek relief in a change of climate. Again she was relieved of her asthmatic symptoms but the profuse nasal discharge continued.

She subsequently made three attempts to remain in the city, but each time after an interval of a few days she was forced, on account of intense asthmatic attacks, to seek relief in the mountains. During all her illness she was under medical treatment, but no attention was paid to her nasal discharge. She came to the clinic in September, 1919, giving the above history.

Examination showed a discharge in her right middle meatus. Transillumination showed the right antrum dark. X-ray examination showed involvement of the right antrum. The antrum needle (Coakley) was introduced and the sinus was washed out. The washing showed a large amount of shreddy muco-pus. After the first irrigation the patient remained well for two weeks, when she again had an attack; which was not, however, so severe as her previous attacks. The antrum was again irrigated and the patient again experienced relief for two weeks. The antrum was washed regularly about every two weeks, and since the last irrigation (December 9) the patient has remained practically free from symptoms. During the above treatment the mother was instructed to irrigate the nasal chambers with salt and bicarbonate.

DISCUSSION.

DR. FREUDENTHAL said it was not new to him that any secretion running from the nose into the pharynx and further down causes a certain asthmatic condition. In children especially it falls down into the larynx and is followed by false croup or laryngismus stridulus and very frequently by bronchial asthma. He had observed cases that were relieved by postnasal treatment alone. Frequently these attacks are due to disease of the ethmoid cells. He had been fortunate in improving many of these cases, but was very careful about giving a final prognosis. He had seen very few maxillary cases.

DR. HERZIG asked if Dr. Bernstein had had his patient tested in regard to protein sensitization; and then cited the case of a physician's wife who had consulted him in regard to relief from asthma. Upon examination, he found enlarged middle turbinates on both sides. He resected both and found cystic turbinate bodies full of polyps which extended into the ethmoid cells. These latter were completely exenterated by a radical ethmoid operation. The antrae were also entered and purulent secretion found; these were irrigated until clear. The patient showed only a temporary relief from the asthmatic attacks. The patient was then tested out with the vegetable and bacterial proteins, and she was found to be sensitive to the yolk of egg. After eggs were excluded from her diet there was a complete cessation of the asthmatic attacks. All cases of asthma that are benefited by sinus operations should be tested with the bacterial and food proteins before one can be sure that the case has been cured by the sinus operation alone.

DR. GOTTLEIB agreed with Dr. Freudenthal that too bright a prognosis should not be given in a case like this that cleared up so rapidly; very often the condition recurs. He had seen cases of frank asthma clear up after a mastoidectomy for three months and then return to the original condition. On the other hand, he had seen an antrum so full of pus that when a tooth was removed it oozed out in a large quantity, yet the patient's asthma was not at all improved. He would therefore suggest a very guarded prognosis.

DR. SCRUTON said apropos of Dr. Bernstein's case that the causative factors of asthma in children were many, any one of which was frequently sufficient to produce the symptoms. Illustrating the difficulties in such cases he recorded one in which the nasal accessory sinuses had been investigated and proven negative. then the protein sensitivity was tested by means of cutaneous reactions and the patient found positive to quite a number of foods, including potato and lettuce. The offending foods were removed from the diet without any resulting modification of the asthmatic attacks. The attacks came on daily for a period of one year in the evening at about eleven o'clock, and were always relieved by hypodermics of adrenalin chloride 1:1000. Vaccines had been tried in this case without favorable result. Finally as a purely empirical procedure a culture of Lactic Acid Bacillus was ordered and recommended to be used in large quantities. Within three days after this treatment was started, the patient did not have an attack of asthma and continued free from symptoms during an entire winter except when

Bulgarian Bacillus culture was discontinued, symptoms promptly returning.

DR. F. N. SPERRY said that he had been much interested in the case and, contrary to some of those who discussed it he believed it to be a case of asthma of antrum origin. In his opinion, Dr. Freudenthal was not on the right track in regard to the etiology of the condition. The pus that runs from a mixillary antrum does not flow into the trachea and cause astama by irritation. Asthma is more likely a manifestation of the absorption of protein; and it may be absorbed from the gastro intestinal tract, or from the ethmoids, or from maxillary antrum. That was pointed out by Matthews of Rochester, Minnesota, before the 1913 meeting of the American Triological Society. Through Dr. Matthews he had become interested in this treatment and became quite enthusiastic about it, and washed out many cases with relief. X-rays and transillumination are useful but even with negative findings some cases of asthma are found to be of maxillary origin by washing them out. For this purpose he uses sodium citrate, 1 per cent in salt solution, the idea being that it is more solvent of muco pus so that you will sometimes get more relief than when plain saline is used. He had relieved many cases by this treatment.

DR. BERNSTEIN said he had not subjected the patient to the protein sensitization test, but she had been under treatment in many places and had been under every form and kind of diet. The fact of the matter was that with all this treatment in the medical department in different places her profuse nasal discharge had always been overlooked; but when she came to the nose and throat clinic, her sinuses were examined, and under the treatment there she got well, and had never been better before. He had not told her parents, however, hat she was cured, for he did not expect that she would be.

Tuberculosis of the Larynx. Dr. George E. Davis.

This patient came to the Clinic at Gouverneur Hospital being referred from the Tubercular Clinic where he had been under treatment for pulmonary involvement for a year. There was a characteristic involvement of the left vocal cord, also the epiglottis, which was greatly infiltrated on the right and centre, had marked ulceration on the left border.

Myxomatous Tumor of the Antrum. Dr. W. C. Bowers.

Albert Sands, male, aged 24, admitted to Bellevue Hospital November 11, 1920. The chief complaint was enlargement of the left cheek. The swelling had appeared three years previously, had been painless, and had gradually increased in size.

Examination showed a decided prominence of the left side of the face, immediately external to the nose. A smooth, oval swelling about three inches in length, was evident above the teeth on the left side. The mucus membrane was not attached. Crackling could be felt in one part of the swelling. Nasal examination showed the left inferior turbinate pushed toward the median line and the floor of the nose considerably elevated. The hard palate was noticeably lowered on the left side. All the teeth were present. Transillumination showed the left maxillary more transparent than the right.

The X-ray report was as follows: The frontals are multilocular, the right being larger than the left; transillumination equal. The left ethmoids are smaller than the right and slightly cloudy. There is a marked diminution of illumination of the left maxillary and its wall is eroded. The nasal wall shows evidence of distinct destruction. The orbital wall has been considerably eroded; the alveolar wall is intact. There is evidence of beginning increased intra-cranial pressure. Diagnosis: Tumor of the left antrum.

I should add that the second bicuspid tooth on the left side seemed to have a misplaced or poorly developed root.

I made an opening into the swelling far forward, in front of the inferior turbinate. The opening was made large enough to admit a

finger. No fluid was obtained. The wall of the swelling was very thin. On Palpation, the surface of the cavity felt as though polypi were present. The cavity was about two inches wide and one and a half inches deep.

About two weeks later, I made an incision along the alveolar margin, extending from the midline to the last molar tooth-elevating the mucus membrane and periosteum over the entire surface of the swelling and removed a portion of bone over it. I now came upon a yellowish-white mass which seemed to be fairly firm in consistency. This was separated from the cavity by blunt dissection, elevated, and removed. It consisted of a mass about two and a half inches long by one and a half inches thick, with a lobular surface, of firm consistency, and was rather friable. At the bottom of the cavity another similar mass was found. A third, about half the size, was removed from under the floor of the nose. The roots of the two bicuspid teeth deviated from each other at a sharp angle; between these roots there seemed to be necrotic bone. The wound was packed with iodoform gauze which was brought out through the nose. The wound in the mouth was sutured.

The pathological examination was as follows: Macroscopically, the specimen consists of irregular-shaped pieces of tissue, the outer surface of which has a distinctly nodular appearance. In section, this tissue is very soft and friable; the cut surface has a glary appearance slightly resembling gelatin. The tumor appears to be made up of a large number of lobules. Microscopically, the section shows specimen to consist of a mass of tissue which is made up, either of cells which somewhat resemble fibroblasts, or a mass of fine interwoven strands which resemble collogen fibres. In many places the cells and fibres are widely separated by an amorphous-like substance which resembles myxomatous tissue. Diagnosis: Myxomatous tissue.

At present, the incision in the mouth is apparently closed. Irrigation of the antrum through the nose brings away a moderate amount of debris. The swelling of the face has almost disappeared—the elevation of the floor of the nose and the depression of the hard palate have assumed a more normal position.

The interesting features of the case are: (1) normal transillumination; (2) size of the tumor—its white, lobulated appearance and its firmness; (3) closure of the wound in the mouth.

DISCUSSION.

Dr. Coakley said that the case was unique in his experience, so far as maxillary masses were concerned. From examination of the patient before examination, and from the appearance of the X-ray pictures, he had felt very sure that it was a dentigerous cyst and one that had not become infected, because of the extra brilliance of the deformed side as compared with the normal side. At his suggestion, Dr. Bowers opened into this supposed cyst through the inferior meatus anteriorly. He had recommended this procedure because in these very large cysts, when opened through the gingival buccal fold, usually leave a permanent fistula along the line of incision, which fistula gives great annoyance and can be only partially closed with a dental obturator. As Dr. Bowers had said, the procedure followed left no opening.

At the time of operation, the mass was of one consistency and appearance that suggested a sarcoma; and it was a new finding for him that the polyp—for that was all that it really was—should grow to size, the rare density, and the consistency of this one. Dr. Bowers was to be congratulated on having made a rather wide incision—with considerable loss of bone from the anterior wall and the superior maxillary, and yet getting primary union of the wound.

Dr. Hurd told of a case seen recently, a man of about thirty, on whom he had made a diagnosis of dentigerous cyst arising from the site of the right upper wisdom tooth which had been extracted. The man came with a diagnosis of maxillary infection, and on douching through the tooth socket, he complained of a great deal of pain, but nothing

came through the nose. Then with the needle through the inferior meatus a free flow was obtained containing thin shreds of white material. On going back and trying to irrigate again through the socket, water was drawn out of the antrus through the nose, and the case was then referred to Dr. Blum, who did not agree with the diagnosis. He operated on the patient, however, and after taking out the tooth in front and opening up the process, the man blew his nose and out flopped a myxoma. It looked like a polyp and that was all that was in there. It had probably grown from the root of the tooth.

DR. THEODOR BLUM said he had seen at Bellevue the case which Dr. Bowers had just described, and was so interested in it that, happening to be in the X-ray room at the time, he took the liberty of examining it, and without the X-ray picture he would surely have made the diagnosis of cyst, and was very much surprised now to learn that it was not a cyst. He regretted very much that he had not been able to be present at the operation, as he was very anxious to see it.

As to the diagnosis of dentigerous cyst made before operation, he wished to call attention to the classification and to the fact that it does not give much information to designate a cyst as a dentigerous cyst, since there are many varieties of cyst that originate from the teeth. Some distinction should be made, for instance, between a cyst originating from a diseased tooth which is called "radicular cyst," and another type belonging around an unerupted tooth, called follicular cyst. A third one is named multilocular cyst, the origin of which is not known.

Regarding the operation for these cysts, he disagreed with Dr. Coakley, and felt that in cysts of the maxilla operation through the external plate is always best unless there is a sinus involvement. He could not see why the sinus should be opened into, for a perfectly satisfactory operation could be done by removing the outer wall. He had done that in many cases, transforming the cyst cavity into a shallow accessory cavity of the mouth by either using the conservative method which consists in removing the outer half of the cyst, (bone membrane) but none of the inner half of the cyst membrane—so that the wound consists of a circular area, while the main area is covered by the cyst membrane, or the radical one by removing the whole cyst sac. The cyst membrane is the conservative operation, although pathological, has been known to change into a mucous membrane which is practically identical with the mucous membrane of the mouth. The conservative operation is indicated in large cysts.

One more point he wished to make; if the nose and throat specialists would co-operate more with the oral surgeons so that each group might become better acquainted with the work of the other, these borderline cases like growths of the jaw would be much better handled.

DR. BOWERS said he thought Dr. Blum had misunderstood what had been said about the opening into the nose; it was not made into the antrum but into the cyst wall itself. The bone was very thin; it was really the wall of the cyst.

Gillies New Method in Giving Support to the Depressed Nasal Bridge and Columella. Lantern Slide Demonstration; Showing of Cases. Dr. J. Eastman Sheehan.

The question naturally arises, what are the best supporting substances to be used in giving permanent support? Bone with or without its periosteum is to be discarded as many times it is slowly absorbed. It is quite difficult to shape and whittle to the desired pattern, thereby causing unnecessary handling of the graft, which lessens its vitality, may cause infection and for these reasons should be excluded as a means of support. This holds good whether the bony rib, ilium, tibia, or turbinates are used. Septal cartilage, consisting as it does mostly of yellow elastic tissues, meets an early death as a rule. It gives a weak support, readily absorbs and has no power to combat infection. As it absorbs it is replaced by fibrous tissues which may act somewhat as a weak support.

Celluloid plates, metalic plates, injections of liquid celluloid, pieces of wax, etc., cannot be too forcibly condemned. They act as an irritant to the tissues, generally sooner or later giving trouble by abcess formation, gangrene, atrophy of skin and finally expulsion. Grafts if they take, particularly that of cartilage, continue satisfactory. Chondral cartilage has no blood vessels and is nourished by lymph absorption. It probably grows when the perichondrium is intact. It combats infection as stated by Gillies. It can be easily handled and shaped to any desired pattern. The experimental work of Davis and the work of Kieth, Murray and Gillies have shown there is a permanence of the cartilage graft. Only in homologous grafts has the cartilage been replaced by fibrous tissues. Autologous grafts never meet with this fate, if the graft successfully takes. The costal Synchondroses are approached by a vertical incision 15 cm. long over the cartilage of the seventh, eighth and ninth ribs, having its middle opposite the junction of the seventh and eighth, and extending through the rectus muscle, which is widely retracted.. This area is chosen because here they expand into a wide placque, and any size and shape cartilage may be taken. A scalpel, a sharp undermining elevator and a blunt retractor are the only instruments necessary for its removal. The excess is boarded under the skin of the chest. A photograph should be taken and a plaster cast made before starting any surgical procedure. They are inexpensive and the casts not difficult to make. They form an excellent record.

The Columella Incision—A vertical incision is made near the mucoskin junction of the columella carried through its whole length, brought forward around the columella at its base and upwards to the opposite side. The columella is now hooked backwards and held out of way by an assistant; the septal mucous membrane on both sides is freed for a short distance. This is done for the purpose of securing a firm hold and accurate approximation when suturing. All septal cartilage is removed from columella if present and the edges and middle are so trimmed that they envelope new graft. The wound is now closed using fine horse hair, care being taken to secure accurate approximation of septal and columella flaps. The pressure bandage so generally used in such cases is omitted, its only use being in case of excessive bleeding. The nasal wound is kept clean for several days after the removal of the stitches, which is generally after 72 hours.

DISCUSSION

Dr. Carter expressed surprise that Dr. Sheehan should consider cartilage transplantation for nasal deformities and the operation he described as something new, in view of the fact that Dr. Carter himself had described this method for treating these cases about fifteen years ago and at intervals since this time had had the honor and pleasure of presenting numerous cases before the Section and other medical societies showing the cosmetic results secured and by serial X-ray plates showing the progress of the transplants in the tissues for years after the operation. This work has been extensively published and Dr. Carter was surprised that Dr. Sheehan is apparently unfamiliar with what has been done in this field of surgery. His statement, unsupported by either clinical or X-ray evidence that bone transplants are absorbed is entirely at variance with Dr. Carter's experience as demonstrated before this Section from time to time, when both clinical cases and X-ray plates, made years after the operation, have shown that the bone graft not only lives, but that it grows; its growth being limited by the functional demands of the part.

Dr. Carter said that he laid no stress upon claims of priority in his professional work, and he wished it distinctly understood that he did not claim the honor of having been the first to transplant bone and cartilage for nasal deformities, though at the time he began his work he had not heard of its having been done. He did, however, about fifteen years ago devise an operation for the correction of depressed nasal deformities by the transplantation of bone and cartilage, and placed it upon a scien-

tific basis. He had modified his technique and improved it from time to time, and his cases and X-ray plates of same, taken by Dr. F. M. Law at varying intervals, in some instances years after the operation, had been exhibited a number of times before the Academy of Medicine and various medical societies, showing the permanency of his results.

Neither autogenous bone nor cartilage, if properly transplanted is absorbed, but cartilage never forms a cartilaginous or bony union with bone. When transplanted it remains separate and distinct from the bony skeleton. It can be moved about to a certain extent but may be strongly held in position by connective tissue. These statements are made without fear of successful contradiction, a sufficient number of cases of long standing having been presented and placed on record to demonstrate their correctness.

Dr. Carter said that after he had been doing this work for several years he conceived the idea of taking his transplant from the costo-chondral junction; by doing this he was enabled to replace the destroyed bony bridge with bone and the cartilaginous bridge with cartilage; thus restoring natural conditions and preserving the normal resiliency of the nasal tip. This method had proved to be entirely satisfactory and a number of cases thus treated had been shown before the Section.

All of Dr. Carter's work is done through one small incision in the vestibule of the left naris and no visible scar remains.

A small incision is of distinct advantage in diminishing the chance of infection. In those cases where the tip of the nose is very flat and almost on a level with the face, instead of depending entirely on the dorsal transplant to support the tip, he does what he calls his prop or strut operation; the dorsal bone and cartilage transplant is introduced as usual; he then makes a small vertical slit in the anterior edge of the septum and with a specially constructed bistoury makes a tunnel between the columellae down to the nasal spine of the superior maxilla and then upwards to the anterior end of the dorsal transplant. A strip of cartilage, its length corresponding to the height to which it is desired to raise the tip, is then introduced through this small slit incision, its upper end being in contact with the end of the dorsal transplant and the lower end anchored in contact with the nasal spine of the superior maxilla. This prop gives excellent support to the tip and insures good results in a very difficult class of cases. A number of patients treated in this manner show excellent results years after the operation.

Dr. Carter said that he could not emphasize too strongly the fact that bone properly transplanted is not absorbed. He was well aware that in making this statement he was contradicting the opinion of many men; but many men, lacking in personal clinical experience, include in their original articles statements that have appeared in books for many generations, and sometimes they are wrong.

Dr. Carter's statement in regard to the fate of the bone transplant was founded upon a knowledge of the subject gained by personal clinical experience extending over years, and the correctness of his conclusions have been demonstrated on many occasions by the presentation before this Section of patients and X-ray plates taken years after the operation, and the statement of no man unsupported by clinical and X-ray evidence could contradict this.

Dr. Carter again called attention to the fact that the bone must be properly transplanted and emphasized the following points: Strict asepsis must be observed (if infection occurs, the transplant usually dies and is absorbed): Make as small an incision for the introduction of the transplant as possible; at least one surface of the transplant should be covered by periosteum (if cartilage, perichondrium); the transplant must be placed in intimate contact with live, periosteum-covered bone, which in the case of the frontal bone should be chiselled into; the part must be immobilized for at least ten days. Autogenous rib transplants are the best, and a combination of bone and cartilage gives the best results.

Replying to Dr. Forbes' inquiry, Dr. Carter said that he had stated plainly in his introductory remarks that when he first used autogenous bone and cartilage transplants for the correction of depressed nasal deformities, he had never heard of its being done before; it may or may not have been done before, he was not in the least interestd in claims for priority, he had simply noted some fifteen years ago that practically nothing had, up to that time, been done, certainly not in a systematic way for this class of deformities (foreign bodies of various kinds had been introduced but they always sloughed out), so he had conscientiously tried to develop and place upon a scientific basis a method for correcting these deformities by replacing in a physiological manner those portions of the framework of the nose that had been lost either by disease or accident and thus restoring the nose to its normal state.

DR. IMPERATORI said that he had many times assisted Dr. Carter in the earlier days of his work on the bone transplant. Many of the cases were operated upon under local anesthesia, but he understood that Dr. Carter now uses general anesthesia for the work. He hoped that Dr. Carter would express an opinion upon the Gillies operation.

In reply to the Chairman, Dr. Carter stated that he saw nothing novel in the presentation except the incision, the width and extent of which seemed to invite infection, if this could be avoided, however he saw no reason why good results should not be secured.

As far as the use of transplants was concerned, Dr. Carter had been doing this for fifteen years and he preferred his own technique to that which had been described.

DR. HAYS said that the point of greatest interest to most was that the realm of rhinoplastic surgery had now entered upon a stage where all and since that time Major Gillies had improved the transplant method great advances made in the last few years, as was known to all who had seen Dr. Carter's and Dr. Riek's work. One can now undertake the operation safely and promise a great deal.

The point raised by Dr. Imperatori was of great interest,—whether the operation can be done better under local or general anesthesia. Infiltration anesthesia seems to be painless and bloodless, and yields excellent results.

DR. FORBES asked if he was correct in understanding Dr. Carter to say that no work in grafting bone and cartilage in cases of nasal deformity had been done up to fifteen years previously, when he started this work. Dr. Forbes also begs to congratulate Dr. Sheehan on his studies abroad.

DR. J. D. WHITHAM said that shortly after the war he had been situated at Sidcup, England, and had worked with Major Gillies for two months, and since that time Major Gillies' had improved the transplant method At that time he used the glabellar incision, and the method just reported by Dr. Sheehan was a decided advance.

Later, he went from London to Paris, and saw Professor Silbileau and Professor Lemaitre operate. He saw a hundred or more cases where grafts had been put in the nose. Prof. Sibileau was using bone from the tibia, altogether. They did not use any cartilage at all. He had been surprised that they did not employ cartilage, but they claimed that the other gave good results and considerably lessened the magnitude of the operation. They showed cases where the graft had been inserted for three years and they looked very well.

It should be emphasized, however, that one cannot promise a patient that any graft put in will not be absorbed, for a certain proportion of bone grafts will be absorbed. At Sidcup where there were 200 ward cases, he had seen some instances where in a few months the graft had decreased in size. That does occur, but not in the majority of cases. One should not promise too much, for some cases will be unsuccessful.

He had inserted one rib graft in a nose under local anesthesia at the Walter Reed Army Hospital, Washington, D. C. The technique was all right, and the man said that it did not hurt too much, but he was a soldier with plenty of grit and it did certainly hurt.

One cannot do all the retraction of the rectus muscle, and other manipulations incident to removal of costal cartilage without utilizing considerable force, and the operation should not be attempted under local anesthesia. Dr. Sheehan is to be congratulated on the beautiful results obtained in the cases.

DR. SCHUTON said that it was unfortunate that the discussion should close without the Section recording the approval or disapproval of the Gillies operation. It had been presented most ably by Dr. Sheehan through the medium of description, screen pictures and the exhibition of a few cases showing the excellent result, yet no definite opinion was recorded. It seemed to him that the Gillies method of flap exposure for the insertion of the graft might be a decided advantage in that it gave such an excellent view for the performance of the work. It would also seem that the cartilagenous graft obtained without the necessity of taking the entire thickness of the cartilage is an improvement for safety of the under-lying pleura. While having no experience with the implantation of the cartilagenous graft in a nose he was willing to admit that it might on trial prove more desirable than bone. As an interne at the time when Dr. Carter was doing his pioneer work along these lines, he had all opportunity to see the development and follow the result in cases through the succeeding years, enabling him to state absolutely that a bone graft will remain in place, if properly inserted, without absorption, notwithstanding Dr. Sheehan's positive statement to the contrary. The Carter operation has proved successful in the hands of many surgeons in America, especially in the City of New York. Any review of the plastic surgery of the nose must necessarily include a thorough consideration of his technique and results, and attribute appreciation for his ingenious skill and courage in attacking a difficult problem.

Dr. Sheehan said that Dr. Carter had said nothing about the value of chrondal cartilage, but had simply told of his experience as a pioneer in this work, which was well known. Rhinoplasty has been done since the time of the Egyptians, and any one who would take the trouble review the Egyptian literature would verify this statement. Every one knows of Dr. Carter's experience and has read his writings and knew that the implantation of bone is good in a way, but it has many disadvantages, as it quite often absorbs, it is difficult to handle and if it becomes infected, has to be removed. Chrondal cartilage has none of these disadvantages and actually has the power to combat infection. I have shown this to be true in presenting before you tonight the patient, Miss D.

Gillies, Russell and Shaw, have long since given up the use of bony grafts in this work. I take issue with Dr. Carter's statement that my knowledge has been taken from text books. It is not alone my experience but that of the great master, Gillies. I am sorry Dr. Carter finds nothing new in this paper. I feel it would be rather hard for him after refreshing his memory to find anything old in this paper. It is to be hoped that the men who have the clinical facilities will give this new method a fair trial.

Dr. Hays spoke of inserting the graft under a local anesthetic. Dr. Sheehan said he had used that method in one case very satisfactorily. Before inserting the graft in the nose the spheno-palatine, vidian, nasal and ascending palatine nerves are anesthetized by packing the nose with cotton saturated with a four per cent solution of cocaine. The anterior dental nerve and the skin over the bridge is injected with one-half per cent of novocain. He had never taken cartilage from the rib under local anesthesia. In the case of Ott, whom I have presented, and whose graft is hoarded beneath the skin of the thorax, I purpose to operate next week under this form of anesthesia.

Opening of Discussion of the Relationship of Sphenoiditis to Diseases of the Pituitary Body and Sella Turcica. Read in Part by Dr. A. Judson, Quimby, New York City.

The subject of the endocrine activities and the various modifying elements that enter into the signs and symptoms of deranged internal se-

cretions, is so broad that one can only take a fragment of the subject and discuss it in the brief time allowed. I am taking this opportunity of presenting a conception of one of the causes of pituitary derangements which I have observed in a number of cases submitted for X-ray examination of nasal sinuses and sella tursica.

The hypotheses that I have formed is briefly as follows: Early in life we have intestinal toxemias and infections lowering the resistance of the mucosa, permitting a succession of coryza and colds, which eventually result in marked nasal disease. The diseased sphenquidal cells have periods of activity with acute processes, and succeeding quiesence. In acute and aub-acute stages of the attacks of the spheniods, the surrounding bone is decalcified to a greater or less degree. In the reparative stages that follow, restoring the bone increases its bulk, thereby invading and decreasing the size of the sella. In addition, the acute processes in the sphenoids serve to produce a general hyperemia and a low grade meningitis. The pituitary gland is covered by the meninges and would be affected by the resulting engorgement, probably over-stimulating this gland in the beginning, later inhibiting its action and instituting the round-cell infiltration, which would eventually result in partial or total destruction of the gland.

The above-described processes are further aided by two anatomical peculiarities of the sphenoid. First, the exceedingly thin body shell between the sphenoidal cells and the floor of the sella turcica; the cells may extend a short distance up into the posterior portion of the sella. Second, the nutrient vessels of the sphenoid enter the bond through a number of small perforations in the floor of the sella.

Recently I submitted the following two questions in a letter to several leading endocrinologists: First, have you knowledge of cases of literature confirming this conception of the cause of pituitary disease? Second, in your judgment would this explain the great prevalence of hypo-pituitary and hyper-pituitary manifestations?

This is the reply of Dr. C. E. De M. Sajous: "In answer to your questions in your favor of the 20th inst., I beg to state that as far as my memory serves me, the literature of the subject does not contain a theory such as that formulated by yourself, corncerning the influence of infections upon the osseus tissues around the sella turcica, but judging from analogy, am inclined to believe that there is good ground for your conception. As regards the influence of these morbid osseus changes, produced in the manner you describe, upon the great prevalence of hypo or hyper-pituitary manifestations, I would be inclined—in the absence of a comprehensive study of the subject—to grant them but a limited, but nevertheless certain responsibilities in their production. Thus, referring only to the morphological factors, a deformity of the osseus bed, of the clenoids, etc., would have to be quite marked to impair the functional efficiency of the anterior lobe, for as you well know, considerable portions of this lobe may be removed without impairing its functional activity. However, the element of pressure due to osseus deformity might be incriminated, and perhaps from the primary cause of acromegaly, cysts, tumors, etc. In dystrophia adiposo-genitalis the infundibulum might be constricted by repairative changes of the meningeal covering of the organ. etc. On the whole, while I would tend in the light of present knowledge, to attribute most of the morbid changes following, as in the thyroid, adrenals, etc., focal hemorrhages or other destruction lesions attending infections, high vascular tension, etc., such as that illustrated in the microphotograph sent herewith, lesions of hereditary syphilis and other inherited or acquired conditions, I believe your view will add considerably to our knowledge when all the problems it entails will be unravelled, particularly in view of the X-ray observations you have already made."

Another letter from Dr. Walter Timme, was as follows: "I have seen two cases at least in which, following infection of the spheniod sinus, in-

tense bi-temporal headaches, pituitary in character, and an X-ray of the skull showed definite canalization between the sphenoid sinus and the sella turcica. One of these cases, following treatment for the sinuses, improved materially; the other one went to the west coast before any definite treatment was well established, and I have lost track of her. I think, however, that your conception is in the main correct. Whether the hypopituitary states, secondary to the original hyperplasia, can be accepted as an absolute course of events can be proven, although in my experience that course of events has taken place."

A reply from Dr. G. H. Hoxie: "Your interesting query of January 20th regarding the effect of sphenoidal infection on the sella tursica and on the pituitary body brings up a matter on which I have very little information. In fact, I do not see how your theory can be proven or disproven without the opportunity to perform autopsies on different cases showing signs of pituitary trouble."

Another reply from Dr. L. F. Barker: "While I think there are undoubtedly some cases in which there is an extension of inflammation from the sphenoidal sinus to the base of the brain I have not had the opportunity of making observations of this sort myself in more than one or two classes. In how far such inflammatory extension could be responsible for changes in the sella turcica and in the pituitary is very hard to determine. I should think that a series of cases controlled both by X-ray examination and later by autopsy would be necessary to permit of decision regarding this point."

My own researches in literature available, has not yielded any evidence that this conception of pituitary disease has been presented. A lot of experimental work has been done on the pituitary and the cases have been classified to an unlimited degree, but as in all endocrine disturbances, it has been difficult to render classifications that were very satisfactory. To illustrate this, we so often frequently see symptoms of hypo and hyperpituitary manifestations in the same subject. Dr. W. Blair Bell, of England, states in his book, that numerous cases presenting early symptoms of pituitary disease go unrecognized. My desire is to present to this Section, my views with regard to the probable means of turning early attention to the sources of pituitary disease, as caused by the above-mentioned link in the vicious circle.

X-ray examination of the sphenoid and sella turcica is now available and should be used to obtain early evidence of bone change. My observation has been that sphenoidal disease is frequently unrecognized until very late. This is often due to the patient not going under the care of a capable nose and throat specialist; that will excuse the frequent delay in the recognition of sphenoidal disease. But when you have this evidence of sphenoidal disease, another step should be taken, that is the determination of changes in the sella, and if the patients are manifesting any of the early constitutional symptoms of hypo or hyperpituitarism, they should be treated accordingly.

The X-ray permits us to obtain evidence of rarefying processes around the sella or a bone reproduction and proliferation. It permits an accurate determination of the size of the sella. In saying "an accurate determination," I do not wish to have this misinterpreted; this accuracy is dependent upon technique, and a due consideration of a diffusion of light from a central point.

Two Frenchmen, Poirier and Cuneo, in doing some experimental work upon the lymphatics, have demonstrated that mercury injections in the sub-arichnoid space, can in some subjects enter the nasal sinuses, the route being along the lymphatics of the nerve sheaths. Recently two other experimenters have demonstrated that the infection of "Encephalitis Lethargica" is primarily in the nasal cavities and extends from these into the meninges, and that the stupor and collapse that characterize the disease are due to obliteration of the pituitary function. These illustrate the fact that infectious processes can extend from the nasal cavities to the pituitary.

The low grade inflammatory processes or long standing or acute processes from active infection occurring in bones, tend to produce changes in adjacent structures, and frequently osteophites are formed and connective tissue infiltration occurs. We can imagine similar pathology arising in the pituitary and surrounding structures when disease is in the sphenoid cells.

We see clinical manifestations of anterior lobe dis-pituitarism which would indicate that all or part of this lobe may be involved without posterior lobe disturbance. Sphenoidal disease can cause passive hyperemia in the blood vessels in and around the pituitary which would precipitate derangement of function and degeneration of the glandular elements. We may normally regard the pituitary as a 100 per cent functioning gland. Diseases of the sphenoid or toxemias may reduce the function of this gland to 50 per cent, which may be a normal amount necessary to maintenance of the patient's functions. Should disease, accident, fright, etc., necessitate a greater demand for pituitary secretion, we then get the sequellae of hypo-pituitarism.

DISCUSSION

DR. CALLISON asked about the type of the headache.

DR. HERZIG asked about the eyesight.

DR. QUIMBY said that the most significant point was the prompt relief secured when the proper treatment was given.

DR. CALLISON said that the program was probably intended to cover the question of pituitary headaches, and not the relationship of the pituitary to sphenodiditis, as there is no connection between infections of the sphenoid cells and dysfunction of the pituitary gland. Infection anywhere indicates a lowered resistance, a disturbance of the immune bodies in the blood. The control of immunity lies with the thyroid-suprarenal-sex gland combination, and only slightly or not all with the pituitary. The patient was evidently suffering from an endocrine dysfunction, but not a pituitary one. She exhibits none of the stigmata of such a derangement, unless there is a pituitary factor in her headache. She indicates an occipito frontal headache—a thyroid headache, but the wide motion of her hand from her occiput to the frontal region might include an intratemporal pituitary headache when it was analyzed. This patient had many of the external indications of thyroid deficiency, and should have thyroid medication. The best evidence that the headache is a headache of thyroid deficiency is the fact that it was relieved by the medication given her, which contains an ample dose of thyroid substance. As the thyroid deficiency will react on the suprarenal and ovaries, and depress their functional activity and so reduce the amount of immune bodies in the blood and her resistance, the infection of the sphenoid sinus would be explained.

It was hoped that Dr. Quimby would give a fuller interpretation of the X-ray appearance of the sella turcica. It would seem that it was almost closed, and one could expect a headache with that condition present, the gland function being interfered with by pressure. As the patient certainly suffered from hypothyroidism there would be an attempt on the part of the pituitary gland to compensate by enlargement. This attempt of one gland to compensate by hypertrophy to supply the deficiency of another is very well illustrated by the numerous cases of thyroid enlargement seen in girls at puberty and adolescence in which there is a thyroid enlargement to compensate for an ovarian deficiency when that gland assumes its full physiological function. In the same way, we may have a pituitary gland that is insufficient to meet the demands made upon it, either primarily or secondarily to a thyroid insufficiency. As there is no room in the sella turcica for its expansion, there may be pressure symptoms and a headache in this case. However, the primary condition and the important one with this patient is her thyroid disturbance. When that is relieved, her headaches will be relieved. With the thyroid frontal and occipital headache the woman presents the myxomatous appearance of the hypothyroid individual.

Dr. Callison expressed the hope that the subject would be brought up again, since it is a most important one.

DR. IMPERATORI said that Dr. Quimby was trying to correlate the points of the closing over of the sella turcica and sphenoidal disease. This woman had a definite sphenoiditis. Had any X-ray men noted this condition of roofing of the sella and sphenoiditis?

DR. LAW said he had noted a great many varieties of sella turcica when making X-ray examinations of the sinuses, but had not made any observations on the shape of the sella turcica unless there were headaches or pituitary symptoms and enough bony change to warrant it. There was so much work at the Manhattan Eye, Ear and Throat Hospital that there was little time to investigate these matters as they should be. There must be some reason for these varieties of sellas, but it can be found out only by the co-operation of the laryngologists the neurologist and the roentgenologist.

DR. LEWALD said the subject was a difficult one to discuss off hand. To diagnose acromegaly would require a careful study of other bones in the body. He had seen many sellas in apparently normal individuals where it was very difficult to draw a definite conclusion as to wether or not any change was going on producing a change in the pituitary body. Only a very prolonged and careful study would show that.

DR. COAKLEY said it was a very serious matter to attempt to interpret these appearances of the sella turcica, as presented by Dr. Quimby, since in any view showing any possible occlusion of the upper portion of the sella, one had only to hold the head a little to one side or the other, or from the mesial plane and it would make that appearance in any sella turcica. When a radiographer reads a plate like that and says that it is occluded, one could not feel that he knows what he is talking about. The only way is to take a pair of stereoscopic views and have a competent man interpret them.

Dr. Coakley said he wished to urge the importance of interest in this matter; the attempts at reading single radiographs showing one or other supposed deformities was rather futile. A beautiful illustration of this had occurred that afternoon where a radiographer had read a plate and said it showed a bilateral tumor in the antrum; it was in the nasopharynx and a piece projected through and looked like a tumor in the antrum.

DR. HERZIG inquired whether the patient's eyes had been tested, as regards the fields of vision. These should always be taken as they greatly assist in diagnosis, and also in placing the area of enlargment of the gland in relation to the pressure on the optic nerves. These fields show various hemianopsias and also quadrangular defects.

DR. IMPERATORI said it might possibly be that the radiographs were wrong and it was possible that they were right; but, it would seem that there must be some relationship between a diseased sphenoid and the roofing of the sella.

The matter was deserving of study and discussion.

DR. FORBES showed a modified adult esophageal speculum. The modification of this instrument consists in having an instrument closed from the proximal end to the distal end of the tube with a short lip of about half an inch.

In presenting this modification of Dr. Jackson's esophageal speculum I realize it is only a modification of an already existing instrument but do feel that the modification of the Jackson instrument to this form presents an additional feature well worthy of note. I was first impressed with the necessity for a complete tube in a case of foreign body in the upper part of the esophagus of a child, where previous attempts at removal had so macerated the tissues that they obstructed the open tube and I, of necessity, used the closed tube of Jackson, known as the interior commisure instrument, which gave me the idea of a closed tube for the adult esophageal speculum.

DR. IMPERATORI said that the Mosher speculum used at Bellevue had somewhat the same features. The large form had proved very useful. It is a closed tube, very much like that shown by Dr. Forbes.

SECTION ON OTOLOGY.

February 11, 1921.

Discussion of Differential Diagnosis of the Central Nervous System and the Value of Functional Tests in Localization. Dr. Lewis Fisher, Philadelphia.

Before attempting to discuss either the diagnosis or differential diagnosis of lesions of the vestibular mechanism, it is essential to have a clear idea of the nerve pathways constituting this mechanism.

(Here slides were shown giving a schematic outline of the nerve pathways starting from the semi-circular canals and terminating in the various portions of the central nervous system.)

The examination of a large number of cases demonstrated the interesting fact that very frequently the vertical canal's function was interfered with at the same time that the horizontal canal's responses remained unimpaired. This was particularly true in cases where there was pressure exerted against the brain-stem. This suggested the probability of a neuraxial differentiation of the fibers from the two sets of semi-circular canals. The exact point within the brain-stem where the fibers from the vertical canals part company from those of the horizontal canal is not known. It was thought that perhaps the vertical canals' fibers take a more mesial course, nearer and more superficial to the floor of the fourth ventricle, thus making them more susceptible to pressure against the brain-stem "en-masse" or to any increase of pressure within the ventricles themselves. For clinical purposes, however, the exact point where these fibers part company is not of such great importance. The important thing is that such a differentiation does exist.

The differentiation between a central and a peripheral lesion is the most difficult phase of this work and can be learned only from an experience with a large number of cases. The case in its entirety, as well as the findings in their entirety, must be studied while attempting such a diagnosis. There are some findings or responses that per se strongly suggest a central lesion. Among them might be mentioned a spontaneous vertical nystagmus either up or down; a definitely perverted response to stimulation; a marked disproportion in the intensity and character of responses such as, for instance, prolonged nystagmus with shortened vertigo or vice versa. The basic rule we attempt to follow is that in peripheral lesions we would probably have a proportionate involvement of *all* responses, remembering that there may be exceptions to such a generalization.

Localization of brain lesions is of but secondary importance and should only be employed in the light of an aid to a neurologic study of a case. Such an ear examination would probably be of greatest service to the neurologist, in cases of angle-lesions, where the definite complex of: no responses whatsoever from one ear with absent responses from the vertical canals of the opposite side, and an active or perverted response from the opposite horizontal canal,—is usually found to indicate rather strongly a lesion in the cerebello-pontile-angle of the side showing no responses. In many other cases the findings on an ear examination might be the earliest evidence that the neurologist can obtain of impending intracranial disease.

DISCUSSION.

Dr. Israel Strauss said that, considered from the standpoint of the nervous mechanism, the ear is properly a part of neurology and that if the neurologist does not avail himself of the various tests that have been devised by the otologists, he might just as well not consider the knee jerks or the examination of the eyes. Judging from what Dr. Fisher had said regarding neurology in Philadelphia, Dr. Strauss said that one might be inclined to be sorry for the neurologists there, although many of them were very good neurologists and were good friends of his. Many of the errors of oversight quoted by Dr. Fisher would have been just as possible in New York in the hands of some professional colleagues here.

These tests are something to be regarded, and there is no reason why the neurologist should not take an interest in this field, for it offers a great deal of assistance in his diagnosis. Occasionally it is true, however, that the neurologist can get along very well without waiting for these vestigular tests. For instance, in the case of the patient who had the hemianopsia and a normal fundus; in such a case there is only one place where he can have the lesion, and that is in the occipital lobe. There is no other place where a lesion giving such symptoms could exist. On other cases, however, the neurologist may feel very sure of his diagnosis, yet need to include this very important mechanism. For instance, a patient had been observed with a staggering gait, an ataxia, a certain degree of hemiparesis, and disturbances of mentality, especially of memory. Such a case might result from a lesion in either the frontal lobe or in the cerebellum; for a disturbance in mentality may occur regardless of where the tumor is situated. A study of the mechanism led to the conviction that there could not be a tumor in the fossa, and operation proved the correctness of the diagnosis. The neurologist might have been correct in diagnosing a frontal lobe lesion without extending the cerebellum, but he ran the risk of making a false localization.

Dr. Strauss said he was very glad to hear what Dr. Fisher had said regarding the responses of the vertical canals. The neurologists have long ago learned to disregard the responses of the vertical canals, for they had found that in almost every case where intracranial tumors were suspected these vertical canals did not function, and it was soon determined that this did not mean anything from a diagnostic standpoint excepting intracranial pressure. Recently a child was seen in the hospital with a cyst in the cerebellum. The child had been decompressed, and came in with evidences of intracranial pressure in spite of the decompression. The case was aspirated, and Dr. Friesner tested out the vestibular system and found that the vertical canals did not respond. After the aspiration the system was tested again, and the response of the canals was normal. We find very often that the testing out of the vestibular apparatus is of great importance in cases of syphilis affecting the eighth nerve. Otologists know that often syphilis of this nerve gives slight changes in the hearing, and tuning forks and bone conduction tests soon lead to a suspicion of something of this kind, but the testing out of the vestibular apparatus gives more definite information. In a recently observed case a man was totally deaf on one side; there was no response to stimulation of either the horizontal or the vertical canal, and no response to stimulation of the vertical canal on the opposite side. He denied syphilis absolutely. The Wassermann reactions of both spinal fluid and blood were negative. Dr. Friesner verified these results, and no other cause could be found. There was a suspicion of a tumor, but there was no headache or choked disc, and no symptoms of intracranial pressure. It was decided, therefore, that it was due to syphilis, and under anti-syphilitic treatment the response in the vertical canals came back and the man began to improve. He afterward admitted that he had lied and had had syphilis, and had been treated with salvarsan, and this was confirmed by the physician who had treated him. It was not a case of intracranial pressure.

A word regarding Dr. Fisher's explanation of the reason why the two tracks, the vertical and horizontal, are separate. He argues that because one is eliminated and the other not, they must have separate paths. That logic does not seem altogether correct; it is not an infallible viewpoint,—for the reason that when the optic nerve is affected by intracranial pressure, choked disc, toxic agents, etc., it does not lose conductivity in all its fibres, but some retain their conductivity. Take, for example, a nerve of the eye that is absolutely white yet the central vision is retained. There are other instances in which nerves are affected in parts and not in others, certain fibres being evidently more resistent to noxious lesions than others.

(To be continued.)